

Northeast Landscape Forest Resources Plan

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Minnesota Forest Resources Council Northeast Landscape Planning Committee
Date Pending Council Approval



Minnesota Forest Resources Council (MFRC)
Landscape Program Document # Pending Council Approval of the Plan
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Dedication

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(1944-2014)

Following a 30 year career with the USDA Forest Service, Dave Miller served the Minnesota Forest Resources Council as its first Landscape Planning Program Manager from 1997 until his retirement from the State of Minnesota in 2005. In more recent years he served as a contractor for the Council. Dave's pioneering work developing the first forest landscape plans for Northeast and North Central Minnesota from the late 1990s through 2003 laid the foundation for subsequent development of four other regional landscape plans and the formation of six regional landscape committees that are still active today implementing the plans and coordinating forest management activities across public and private ownerships. This draft Northeast Landscape Plan revision would not have been possible without the visionary work of Dave Miller.



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Overview

Northeast Landscape Forest Resources Plan



A. Plan Revision Overview

The *Northeast Landscape Forest Resources Plan* is a strategic document intended to provide a broad framework for collaboration in landscape planning and coordination of forest resources management across all ownerships in the region. This plan was developed by the Northeast Landscape Planning Committee which was composed of a diversity of stakeholders representing the range of interests and ownerships in the region.

The Northeast Landscape Planning Committee developed this regional-scale framework to provide direction on ecological, economic, and social aspects relating to sustainable forest management. In doing so the Planning Committee utilized a series of background data and research documents to identify a series of desired future conditions, goals, and objectives to ensure sustainable forests in the region.

The Minnesota Forest Resources Council (MFRC) defines the Northeast Landscape as the four northeastern Minnesota counties; Carlton, Cook, Lake, and St. Louis. Ninety-two percent of this 7.3 million acre area is terrestrial, of which eighty-five percent is forested (5.8 million acres). Most of the region is rural with the exception of Duluth, Virginia, Hibbing, Cloquet and several other small communities scattered throughout the area. The Northeast Landscape is located entirely within the Laurentian Mixed Forest Province and is characterized by a wide range of public and private landowners with a higher percentage of publicly owned land (71% of the forestland) than other regions of the state.

The original Northeast Landscape Committee was organized in June 1997 and was the first regional committee to develop a landscape plan (approved by the Council on March 25th, 2003). This plan developed a series goals and strategies for several specific ecological plant communities in the region.

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The SFRA did not establish a process for maintaining or updating the landscape plans; however, over time regional committees began to recognize that the first generation plans did not address some significant issues they were facing in their coordination and implementation efforts. The Northeast Landscape Committee identified a range of issues and concerns that were not addressed in the 2003 Plan. Some of the topics included forest mortality, fuel load management, recreation, bioenergy, climate change, and parcelization/fragmentation. Further, it was recognized that more consideration for economic and social issues per the SFRA were needed.

In December of 2010, the Northeast Landscape Coordination Committee unanimously supported the updating of the 2003 Northeast Landscape Plan and at the May 2011 MFRC meeting, the Council agreed with the recommendation from the Coordination Committee and directed that the second generation plan be created.

The purpose of this revised plan is to provide a strategic framework that allows landowners, local officials, resource managers and other stakeholders to work together to voluntarily implement landscape strategies to effectively sustain the forests of Minnesota.

B. Management Directions

Part 2 of the plan provides the core management direction in the plan. This Strategic Policy Framework asks the general question “Where do we want to go?” To establish this framework the Planning Committee used the information reviewed in Part 1 to develop a series of landscape-wide management directions (Section 6) and a specific vegetation management framework (Section 7).

Section 6 describes the vision for the future forest conditions across the Northeast Landscape by providing the Desired Future Conditions and the approaches (Goals and Objectives) that the Coordination Committee and its partners can take to promote the management of healthy forests in the region. The SFRA requires the MFRC and its regional committees give equal consideration to the long-term economic, ecological, and social needs and limits of the state's forest resources. The Northeast Planning Committee addressed this legislative directive by organizing the strategic policy framework into seven Resource Topics; each of which includes relevant ecological, economic and social components to meet the requirements of the SFRA. (Note: These are not listed in order of importance):

- A. Forest Land Base
- B. Vegetation and Terrestrial Wildlife
- C. Water Resources and Aquatic Wildlife
- D. Forest Products
- E. Recreation
- F. Minerals
- G. Social and Cultural Uses and Values

The Northeast Landscape Planning Committee identified Assets which benefit or support each resource, and Issues which describe problems or unresolved conflicts. Desired Future Conditions, Goals, and Objectives were then identified to sustain the assets and address the issues identified. In some cases, these Desired Future Conditions, Goals, and Objectives are very specific to the resource. However, there are also important opportunities to benefit multiple resources by considering Desired Future Conditions, Goals, and Objectives from multiple Resource Topics together. Managers should consider and weigh the desired future conditions, goals, and objectives identified in all of the Resource Topics when creating plans and projects. There is a broad array of perspectives, responsibilities, and interests regarding the management of forest resources in the region. It is recognized that not every plan, project, or acre can contribute to every goal or objective. At the same time, collaboration to achieve common goals will benefit the forest resources of the Northeast Landscape.

As a part of the Northeast Landscape Plan Revision, the Northeast Planning Committee developed a series of specific forest management goals and strategies based on NPC systems and classes in Section 7. These goals and strategies are based on the upland and lowland forest systems delineated in the NPC study and replace the Range of Natural Variability (RNV) goals established in the 2003 Northeast Landscape Plan. Goals and strategies were developed for the following NPC forest communities:

Upland Systems

- Fire Dependent Forest/Woodland.
 - o FDn32: Northern Poor Dry-Mesic Mixed Woodland
 - o FDn33: Northern Dry-Mesic Mixed Woodland
 - o FDn43: Northern Mesic Mixed Forest
- Mesic Hardwood Forest.
 - o MHn35: Northern Mesic Hardwoods and MHn45: Northern Mesic Hardwoods (Cedar)
 - o MHn44: Northern Wet-Mesic Boreal Hardwood-Conifer Forest

Lowland Systems

- Acid Rich Peatland.
- Forest Rich Peatland.
- Wet Forest.

Land managers and owners are encouraged to adopt and implement these more specific goals and strategies. They are also encouraged to view ECS and NPC as tools to provide relevant information to the decision making process, these concepts are not an end or a goal in and of themselves. The Planning Committee further encourages that landowners use these concepts as ways to mimic natural systems and forests habitats in order to promote the sustainable management of forests across the landscape region.

C. Implementing the Northeast Landscape Plan

Part 3 asks the general question “How will we get there?” To address this question the Planning Committee outlined an organizational structure and series of coordination strategies that they believe are necessary to support the successful implementation of this Plan.

The Planning Committee stressed the regional and voluntary context of this document and that its primary role is to coordinate and facilitate sustainable forest management by the vested stakeholders. The implementation of this Plan will be only as successful as the commitment and imagination that partners in the region bring to the overall landscape management process. The Coordination Committee will provide ideas, direction, and context to support the implementation of this plan; however, the primary work on-the-ground across the Northeast Landscape will be done by partnering foresters and loggers, contractors, land managers, resource agency staff, forest products industry, individual landowners, local officials, among others.

The primary users of the Plan will be the Northeast Coordination Committee and active forest management interests in the region. The Northeast Coordination Committee will meet on a regular basis to coordinate land management activities and support the development and implementation of collaborative projects. In general terms, this Plan will be implemented through four basic approaches including:

- Encouraging consideration of the landscape-level context by all agencies, organizations, industry, and private landowners when developing their resource management plans and implementation projects.
- Coordinating and supporting projects by partner organizations that promote sustainable forest management practices in the Landscape.
- Developing and implementing committee led projects that proactively address the goals and strategies outlined in the Landscape Plans.
- Monitoring activities and outcomes of projects implemented by the Coordination Committee, as well as those by partnering organizations and landowners across the landscape.

Each partnering entity that participates in the coordination and implementation of this Plan will experience increased benefits over time and help to ensure long-term ecosystem integrity and healthy economies and human communities.

Part 1. Purpose and Context: Where have we been and where are we today?

Section 1 Introduction



A. Sustainable Forest Resources Act

The Minnesota State Legislature enacted the Sustainable Forest Resources Act (Minn. Statutes, Chapter 89A) in 1995, which established the Minnesota Forest Resources Council (MFRC) and formalized the state's policy to:

- pursue the sustainable management, use, and protection of the state's forest resources to achieve the state's economic, environmental, and social goals;
- encourage cooperation and collaboration between public and private sectors in the management of the state's forest resources;
- recognize and consider forest resource issues, concerns, and impacts at the site and landscape levels;
- recognize the broad array of perspectives regarding the management, use, and protection of the state's forest resources and establish processes and mechanisms that seek and incorporate these perspectives in the planning and management of the state's forest resources.

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The purpose of the MFRC is to develop recommendations to the Governor and to federal, state, county and local governments with respect to policies that result in sustainable management of forests in the state. The policies must:

- acknowledge the interactions of complex sustainable forest resources, multiple ownership patterns, and local to international economic forces;
- give equal consideration to the long-term economic, ecological, and social needs and limits of the state's resources;
- foster productivity of the state's forests to provide a diversity of sustainable benefits from the site to landscape levels;
- enhance the ability of the state's forest resources to provide future benefits and services;
- foster no net loss of forest land;
- encourage appropriate mixes of forest cover types and age classes within landscapes to promote biological diversity and viable forest-dependent fish and wildlife habitats;
- encourage collaboration and coordination with multiple constituencies in planning and managing the state's forest resources;
- address the environmental impacts and implement mitigations as recommended in the *Generic Environmental Impact Statement on Timber Harvesting and Forest Management*.

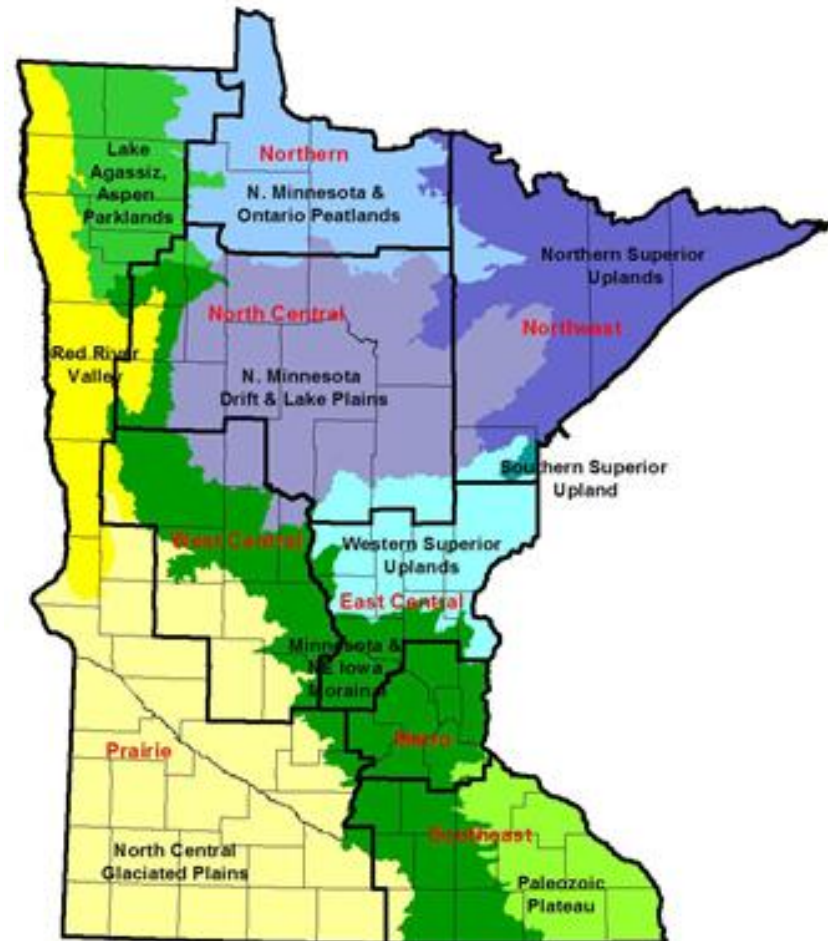
B. MFRC Landscape Program

The Sustainable Forest Resources Act (SFRA) provided authorization for the establishment of regional landscape committees to foster landscape-based forest resource planning and coordination. This legislation defined landscape-level planning as “long-term or broad based efforts that may require extensive analysis or planning over large areas that may involve or require extensive coordination across all ownerships.” It charges regional committees to: 1) include representative interests, 2) serve as a forum to discuss issues, 3) identify and implement an open and public process whereby landscape-level strategic planning can occur, 4) identify sustainable forest resource goals for the landscape and strategies to achieve those goals, and 5) provide a regional perspective on forest sustainability to the Council.

The MFRC established the Landscape Program in June 1997 to organize and support the regional Landscape Committees. Following direction from the SFRA, the MFRC Landscape Program established regional committees to solicit the input of diverse forest resource interests within particular forested “Landscapes”. These Landscapes are based on broadly defined ecological units, yet recognize existing political and administrative boundaries for delineation. The state has been divided into eight Landscapes as shown in the figure to the right. These regional committees provide an opportunity to involve private citizens, natural resources professionals, and members of various interest groups in developing and implementing landscape-level plans that promote forest sustainability.

The MFRC Landscape Program provides an ongoing means of addressing regional issues through local partnerships that help to develop and accomplish citizen-identified short-term and long-term sustainable forest management goals and projects for the broader landscape region by bridging land ownership and forest types.

Find more about Minnesota’s forested Landscapes, the process of Landscape-level forest management, and the regional volunteer committees here: http://mn.gov/frc/initiatives_11m.html



C. Northeast Landscape Region

This plan is for the Northeast Landscape (See figure on the preceding page) and the objective of the Northeast Landscape Committee is to collectively identify, discuss, and resolve important regionally-based forest resources management issues. As mentioned in the preceding section, MFRC Landscapes are based on broadly defined ecological units, yet recognize existing political and administrative boundaries for delineation. This section elaborates on these different levels of organization.

Geopolitical Context

The Minnesota Forest Resources Council defines the Northeast Landscape as the four northeastern Minnesota counties; Carlton, Cook, Lake, and St. Louis. Most of this 7.3 million acre region is rural with the exception of Duluth, Virginia, Hibbing, Cloquet and several other small communities scattered throughout the area. A map of population density by minor civil division is available in Section 6 of this Plan.

County	Area		Municipal Divisions				2010 Population	
	Acres	% of Total	Cities	Townships	Unorganized	Total Municipal	Population	% of Total
Carlton	559,725	7.6	10	19	5	31	35,386	14.1
Cook	1,027,587	14.0	1	3	3	7	5,176	2.1
Lake	1,464,087	19.9	3	5	3	11	10,866	4.0
St. Louis	4,312,245	58.6	26	73	13	112	200,226	79.6
Totals	7,363,644	100.0	40	100	24	161	251,654	100.0
Source: 2010 U.S. Census Bureau and DNR Data Deli								

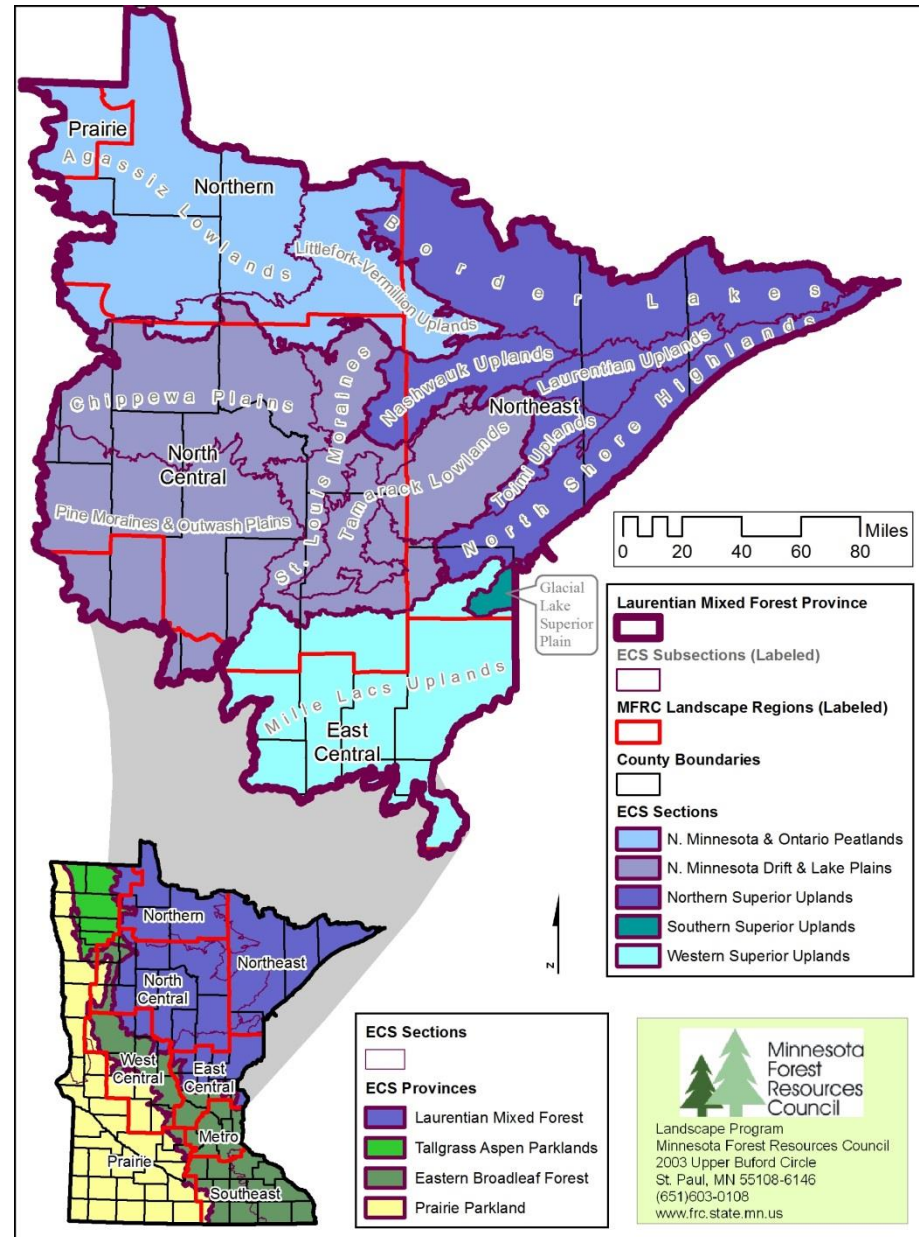
Ecological Context

The Northeast Landscape can be further described using the Ecological Classification System (ECS), which defines regions that have similar ecological characteristics such as geology, vegetation, soils, etc. The Northeast Landscape is located entirely within the Laurentian Mixed Forest Province (bottom of image). There are five ECS Sections that cover the region and a total of ten ECS Subsections within those Sections (upper image). Within the ten subsections, there are 68 Land Type Associations (LTAs) and the average area of a LTA is approximately 145,000 acres. The table below summarizes the acreages of ECS Sections within the Northeast Landscape.

ECS Sections in the Northeast Landscape

ECS Section	Code	Acres	% of Total
Northern Superior Uplands	NSU	5,609,755	76.2
N. Minnesota Drift & Lake Plains	DLP	1,132,137	15.4
N. Minnesota & Ontario Peatlands	NMOP	303,575	4.1
Western Superior Uplands	WSU	206,662	2.8
Southern Superior Uplands	SSU	109,676	1.5
Total		7,361,805	100.0

Source: MN DNR Data Deli



Generalized Land Cover

Roughly 6.8 of the 7.3 million acres (93%) in the Northeast Landscape are terrestrial and 85% (5.8 million acres) of this terrestrial habitat is forested. The Northeast Landscape can be further divided into upland and lowland communities. Approximately 63% of the region is classified as upland habitat and 37% is characterized by lowland vegetation. The majority of this lowland habitat is in the western portion of the Northeast Landscape with upland forests ranging across the northern and eastern portions of the region. Agriculture and developed land are relatively minor components of the landscape, however developed land estimates have been increasing at a rate of approximately 4,850 acres per year. Although mining is only 1.1% of the Landscape Region's land cover, it is concentrated in the Mesabi Range portion of the Landscape and represents a major land use locally and may increase with possible and proposed mining expansion. A map of regional land cover is available in Section 6 of this Plan.

These patterns have shifted somewhat since data was collected on the region for the 19th century Public Land Survey but are less altered by modern settlement and land-use than other Landscapes in the State.

Land Ownership and Management

The Northeast Landscape is characterized by a wide range of public and private landowners and each has their own management goals and interests. This region features a high percentage of publicly owned land (71% of the forestland) although the estimated ratio of public forestland to private forestland ranges greatly across the landscape from 0.6:1 in Carlton County to 5.5:1 in Cook County. This public land is owned and/or managed by a variety of entities, including the US Forest Service, three Chippewa Tribes, the Minnesota DNR, and County Land Departments. In some instances, such as the tax-forfeit lands, the management entity is not the same as the owning entity. In the case of tax-forfeit lands, the state owns the lands and the counties manage them. A map of regional land management by entity is available in Section 4 of this Plan.

There has been a shift from industrial to non-industrial family ownership within the private forestland of the region. Most family forest lands in the region, with the exception of waterfront property, are owned in parcels greater than 50 acres and over 60% are owned by individuals greater than 55 years of age.

D. Regional Forest Resources Committees

The SFRA provided authorization for the establishment of regional landscape committees to foster landscape-based forest resources planning and coordination. This legislation defined landscape-level planning as *“long-term or broad based efforts that may require extensive analysis or planning over large areas that may involve or require extensive coordination across all ownerships.”* The SFRA requires the regional committees fulfill and/or address many functions and activities in landscape planning and coordination. The following summarizes these functions:

- Include representative interests in a particular region that are committed to and involved in landscape planning and coordination activities.
- Serve as a forum for landowners, managers, and representative interests to discuss landscape forest resources issues.
- Identify and implement an open and public process whereby landscape-based strategic planning of forest resources can occur.
- Integrate its report with existing public and private landscape planning efforts in the region.
- Identify and facilitate opportunities for public participation in existing landscape planning efforts in this region.
- Identify sustainable forest resources goals for the landscape and strategies to achieve those goals.
- Provide a regional perspective to the council with respect to council activities.
- Facilitate landscape coordination between existing regional landscape planning efforts of land managers, both public and private.

The MFRC Landscape Program established Landscape Committees on a regional basis to implement these state policies at the landscape-level throughout the State.

The committee for the Northeast Landscape, which includes Cook, Lake, St. Louis, and Carlton counties, was the first in the state to organize. In 1997, the Northeast Landscape Committee began working to find agreement on how best to achieve long-term forest sustainability by determining the desired future forest conditions and developing goals and strategies to achieve the agreed-upon desired future conditions.

According to participants, the landscape management process has developed useful scientific approaches, information, and valuable tools for landscape assessment; fostered working relationships with a diverse set of people; produced landscape direction for agencies and other landowners on a voluntary basis; developed strategies for implementing this landscape direction; and facilitated better communication among diverse groups. Also, landscape management has helped land managers and other partners recognize that individual forest and related natural resources management choices must be viewed in the context of those of their neighbors and that the multiple management objectives of the various land managers can provide for a diverse and balanced landscape condition in terms of ecological, economic, and social conditions.

Section 2

Landscape Planning Process



Landscape planning is a voluntary, consensus-based approach that brings together people who have an interest in the long-term health and vitality of a particular region. It is a process that helps landowners and resource managers better understand how an individual property, site, or area fits into the larger region or ‘Landscape.’

A. Forest Resources Planning in Minnesota

The state of Minnesota covers approximately 54 million acres. Today, forestland covers approximately 16.7 million acres of the state or 30.9 percent. About 55 percent of the forestland is public and 45 percent is private. Forest management plans have been developed for most of the public forestland but much of the private forestland is not currently under a management plan. These forest management plans have been prepared by various agencies and organizations and cover a range of topic areas. The following provides an overview of forest management plans currently used in the state:

- MFRC Landscape Plans: These plans focus on six major forested landscapes statewide. The six landscape plans cover approximately 34.5 million acres.
- National Forest Plans: These are ten to fifteen year plans for the Superior National Forest, including the Boundary Waters Canoe Area Wilderness, and the Chippewa National Forest. They cover approximately 3.0 million acres of federally owned lands in northern Minnesota.
- Tribal Forest Plans: Some of Minnesota’s eleven tribes have forest plans for the several hundred thousand acres of tribal forestland.
- DNR Subsection Forest Resource Management Plans: These are primarily vegetative management plans, including timber harvest, for 4.8 million acres of state forestland managed by DNR Forestry and Wildlife Divisions.
- County Land Management Plans: Fifteen northern and central Minnesota counties manage 2.8 million acres of forestland.
- Industrial Land Forest Plans: Forest and other industrial forestland owners have plans for about 1.0 million acres of owned land.
- Stewardship Plans: Some of Minnesota’s 150,000 family forest owners have plans covering 10 to 15 percent of the 6.0 million acres of family privately owned forestland.

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By Minnesota statute, the MFRC Landscape Plans are developed across all ownerships in a region and cover the largest land areas of forest management plans in the state. They are intended to provide a framework for collaboration in landscape planning for forest resources across all ownerships.

B. First and Second Generation Landscape Plans

2003 Northeast Landscape Plan

The Northeast was the first region to develop a landscape plan. The original Northeast Landscape Committee was organized in June, 1997 with over 60 people expressing interest in participating. Over 35 people remained active through the process. The Committee established three “work groups” of approximately 10 to 12 people to work on assessment information, coordination, and outreach activities.

The Committee broke new ground on how to conduct landscape-level planning and analysis. A great deal of learning occurred and new information and processes had to be developed. Early in the process the Committee chose to follow an ecologically based process based on native plant communities rather than forest cover types and on site potential rather than what tree species currently exist on the site. The Committee decided to complete the ecological analysis first and then determine the economic impact of any proposed changes. It did not develop explicit economic and social goals.

The Minnesota Forest Resources Council approved the first generation Northeast Landscape Plan on March 25th, 2003. Partners in the region have been actively implementing the plan ever since.

Decision to Revise the 2003 Northeast Landscape Plan

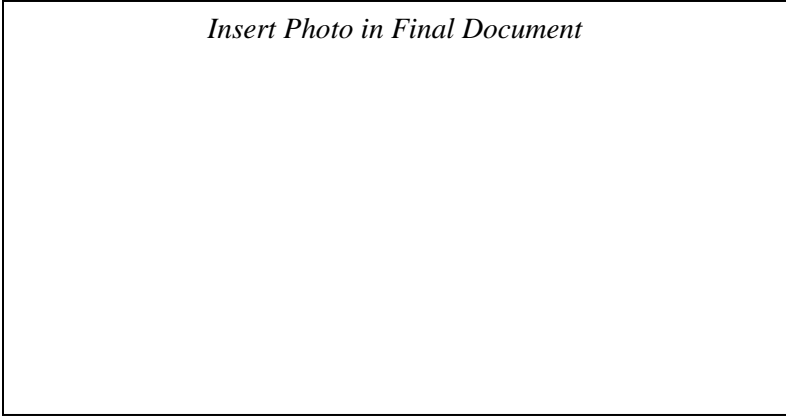
While the SFRA did not establish a process for maintaining or updating the landscape plans, over time regional committees began to recognize that the first generation of plans did not address some significant issues they were facing in their coordination and implementation efforts. The Northeast Landscape Coordination Committee (the group organized to oversee the coordination, implementation, and monitoring of the plan after it was approved) identified a range of issues and concerns that were not addressed in the 2003 Plan. Some of the topics included forest mortality, fuel load management, recreation, bioenergy, climate change, and parcelization/fragmentation. Further, it was recognized that more consideration for economic and social issues was needed as the 2003 Plan did not develop explicit economic and social goals.

Parallel with the work by the Coordination Committee, there were some key research and coordination initiatives underway that could support the development of the revised plan. These initiatives included the US Forest Service Northern Minnesota Climate Change Response Framework Project, the University of Minnesota Institute on the Environment’s Boreal Forest and Community Resilience Project, forest economic research by the University of Minnesota Duluth School of Business, and meetings of various Minnesota forest management leaders on the All Lands Management Team. Products and information from these parallel efforts have been integrated into this planning process and are further described in Section 3.

In December of 2010, the Northeast Landscape Coordination Committee unanimously supported the updating of the 2003 Northeast Landscape Plan. At their May 25, 2011 meeting, the Council agreed with the recommendation from the Committee and directed that the second generation plan be created.

C. Formation of the Second Generation Northeast Regional Landscape Planning Committee

Following the Council’s decision to revise the 2003 Plan, an invitation letter was sent to a broad range of organizations and interests throughout the region asking for their participation on the second generation planning committee. Over 45 people expressed interest in participating by attending planning process meetings. The members of the Planning Committee and the organizations and interests they represent are provided in Appendix A.



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D. Planning Process Overview

General Steps in the Planning Process

The general process that was used by the Planning Committee to develop this Plan included the following major steps:

- Brainstorm and prioritize forest resources management assets and issues in the region.
- Develop an inventory and assessment of the resources in the region.
- Gather and inventory existing policies relating to forest management from plans adopted by local, regional, and state organizations.
- Identify and synthesize resource trends and key findings.
- Develop guiding principles and define the long-term desired future conditions.
- Establish a comprehensive policy framework of goals, objectives, and action items to address the issues and sustain the assets that were identified.
- Begin clarifying the appropriate roles and responsibilities of stakeholders in coordinating and implementing this Plan.

E. Committee Input

A total of twenty Planning Committee meetings were convened to prepare this Plan. Committee members provided direction and input throughout the planning process. A series of methods and approaches were used in gathering committee input including systems mapping, trends exploration, an economic work group, small-large group discussions, and draft document reviews.

One of the parallel efforts in gathering stakeholder input for this Plan was supported by the University of Minnesota Boreal Forest and Community Resilience Project (BFCRP). The overall objective of the BFCRP project was to promote community and ecosystem resilience in the context of uncertainty through partnership, research, creative visioning and planning. The BFCRP supported the gathering of input from the Planning Committee through the systems mapping exercises and a trends exploration workshop described below.

Systems Mapping

BFCRP staff developed a ‘systems mapping’ exercise in December of 2011 to give Planning Committee members an opportunity to identify and discuss important issues relevant to the Northeast Landscape. Systems mapping is a tool used to help a group dissect and relate individual components of complex systems to achieve a better understanding of complex systems, and identify and prioritize solutions to challenging, multi-faceted problems. It is intended to provide a relatively quick way to identify the key parts of a system and to sketch out how they relate to each other. Systems mapping also helps a group develop a shared understanding of what affects a system they care about and how to act to influence the stability and health of that system.

For this planning process, the BFCRP staff used systems mapping to talk through six issues identified as most important for the region by the Planning Committee: 1) Economic Development; 2) Forest Management; 3) Habitat and Wildlife; 4) Invasive Species; 5) Tourism and Recreation; and 6) Water Quality. These were not the only important issues, but discussing them through the systems mapping exercise provided an opportunity to address a broad set of relevant topics. The exercise also gave groups the chance to identify where more information was needed and highlight opportunities for the NE Plan to target future goals and recommended actions.

A copy of the Systems Mapping results and associated report is available on the MFRC website (www.mn.gov/frc/initiatives_11m_committees_northeast.html).

Trends Exploration

On June 12, 2012, BFCRP staff facilitated a workshop for the Northeast Landscape Planning Committee in an effort to better understand participants’ perspectives on trends and implications of key topic areas relevant to the Northeast Landscape. The majority of the workshop focused on discussing trends and implications in twelve topic areas: Administration and Funding; Climate Change; Demographics; Development and Ownership; Ecological Health and Condition; *Economic*; Forest Products; *Invasive Species*; Tourism; *Tribal Trends*; Water and Fisheries; and Wildlife. Nine topic areas were identified during expert presentations from earlier meetings, and three additional topics were proposed by participants during the day of the workshop (indicated in italics).

From this workshop, it was determined that nearly all of the 30 trends identified in the twelve topic areas were deemed important to the Northeast Landscape, and most participants felt the trends and implications were relatively immediate concerns. While there was some diversity in participant responses, most respondents indicated a number of the trends should be addressed in the revised Northeast Landscape Plan, and the crucial timeframe for all of the trends and their potential impact was in the next twenty years.

The nineteen participating Planning Committee members were asked to identify how important it is to address the identified trend in the Northeast Landscape Plan Update on a scale of one to ten (ten being the most important). The average (mean) vote for nearly all the trends (28 of 30) was five or greater, indicating many respondents felt the trends identified in this process are relatively important to address in the Plan.

A copy of the Trends Exploration report is available on the MFRC website (www.mn.gov/frc/initiatives_llm_committees_northeast.html).

Economic Work Group.

A subcommittee of the Northeast Planning Committee was created to assist the University of Minnesota Duluth School of Business researchers in the development of their regional economic analysis study. The Economic Work Group met four times in 2013 to review FIA data, develop plausible economic scenarios, and provide input on assumptions used in the scenarios which became the basis for the ten year projections. Input from the work group members was invaluable to the economic research project, which was then supportive to the development of this Plan. Staff from University of Minnesota Duluth School of Business gave several presentations to the Planning Committee on the economic research. Products developed from this research are summarized in Section 3.

Small Group – Full Group Discussions

Meetings 13, 14, and 15 were used to develop the ecological, economic, and social goal and objective sections after a common framework of understanding was developed in earlier meetings. These goal and objective sections were developed through a small group – large group brainstorming process where the Committee was randomly split into 5-8 person work groups during a meeting to discuss and refine draft goals, objectives, and action items. This allowed everyone an opportunity to include their ideas into the draft document. Following these discussions, group leaders presented their group's ideas to the entire Committee. These small group ideas were then compiled between the meetings and the revised draft was discussed with the entire Committee at the start of the next meeting. This allowed the Committee to discuss issues as a whole and in many cases arrive on consensus or general agreement about language as an entire group.

Committee Review

Based upon information provided by members of the committee and presentations by invited experts, MFRC staff drafted sections of the plan to reflect the discussion, decisions, and ideas of the committee. These draft sections of the plan were then sent to the Committee for review. During this time period the Committee was able to provide comments on specific sections and send them to MFRC staff for compilation. MFRC staff integrated these suggestions into the draft document and presented it to the committee on June 23rd, 2014 where the Committee approved the draft plan and recommended opening the public comment period.

Subcommittee Review

At the March 7th, 2014 meeting the Committee recommended the MFRC staff coordinate the establishment of a subcommittee to review the plan and develop a new draft to present to the entire planning committee. This group met six times and helped develop a new layout, developed new material, and addressed conflicts on several issues. These were then integrated into a new draft and presented to the Committee at the June 23rd, 2014 meeting.

F. Public Review and Comment Process

The Sustainable Forest Resources Act (SFRA) provides the following guidance on the public review requirements for landscape planning: “(3) identify and implement an open and public process whereby landscape-based strategic planning of forest resources can occur”.

The following public review process was used for approving the Plan:

- Send email notice announcing public review process to interested persons and entities in the region.
- Post notice in the EQB Monitor.
- Send press releases to three local newspapers in the region announcing public review period.
- Post the public review draft Plan on the MFRC website.
- Public review and comment period – 45-day period.
- Review / recommendation by the LAC.
- Review / approval of the Plan by the Council.

G. Council Approval

The Minnesota Forest Resources Council reviewed and approved this Plan on _____, 2014 (*insert date after approval by the Council*).

Section 3

Background Resources



This section provides a brief description of the resources and documents that supported the Committee’s conclusions and recommendations developed in Part 2 and 3 of the Plan.

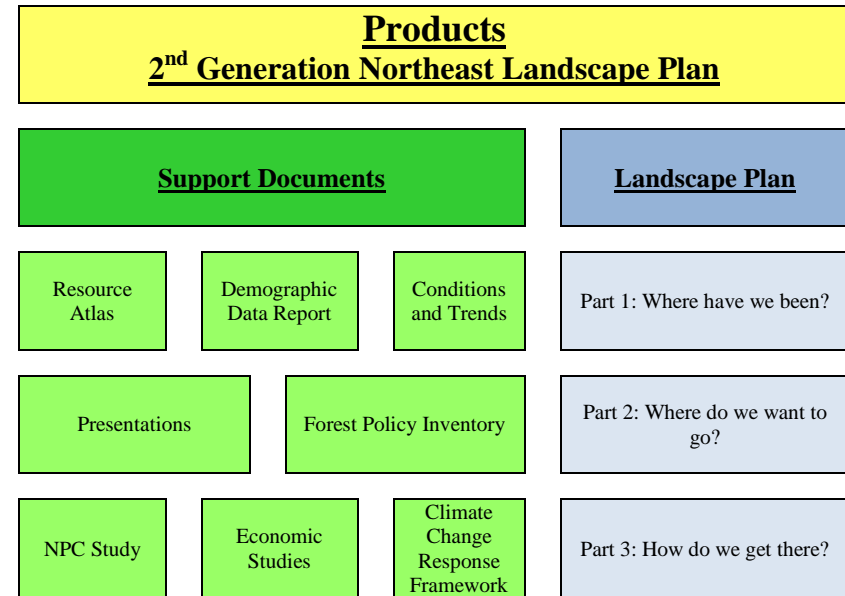
A. Overview

The Minnesota Forest Resources Council (MFRC) and its Landscape Program function as forums where diverse interests utilize a foundation of credible science and collaboration to discuss and resolve issues regarding the management of Minnesota’s forests. The first step in the development of each regional landscape plan is to compile a series of assessments and support documents to provide the Planning Committee with a scientific baseline on existing and potential ecological, social, and economic conditions in the region. These assessments give as accurate a picture of the region as possible given the limitations of available information and were continually developed throughout the planning process as the Committee identified new issues and requested more specific information.

The Committee reviewed a series of reports, studies, maps, and data as well as a series of presentations on forest management topics prepared specifically for the Northeast Landscape planning process. These supporting documents are organized into the following:

- Technical support documents
- Research studies
- Presentations
- Forest policy documents

The diagram to the right summarizes the support documents and their application to the development of the plan.



B. Technical Support Documents

Resource Atlas

The Northeast Landscape Resource Atlas was developed to provide the Planning Committee a better understanding of the natural and cultural resource base in the region as they developed the second generation landscape plan. This in-depth series of inventory maps and tables was developed by MFRC staff to display the best available data from multiple agencies. The maps were made available to the Planning Committee for review at meetings and online. The following is a list of maps and tables that have been compiled for the Northeast Landscape Planning Committee as a part of the planning process:

- Political Boundaries
- Land Ownership (1976-2007)
- Land Management (1976-2007)
- Proclamation Areas
- Native American Reservations and Treaty Boundaries
- Quaternary Geology
- Landforms
- Topography
- Shaded Relief
- Major Watersheds
- Soils - Farmland Class
- Soils - Drainage Class
- Soils - Hydric Rating
- ECS Provinces, Sections, and Subsections
- ECS Sections, Subsections, and Land Type Associations
- Presettlement Land Cover (1895)
- Land Cover (1992)
- Land Cover (2001)
- Land Cover (2006)
- Presettlement Land Cover (1895) - Reclassified
- Land Cover (1992) - Reclassified
- Land Cover (2001) - Reclassified
- Land Cover (2006) - Reclassified
- MBS Native Plant Communities
- MBS Biodiversity Significance
- Potential Native Plant Communities
- Change in Relative Abundance of Aspen by ECS Land Type
- Change in Relative Abundance of White Pine by ECS Land Type
- High Conservation Value Forest Candidates
- School Trust Lands
- Forest Stewardship Plans
- Watershed Health Score
- Impaired Waters
- Designated Infested Waters
- Trout Stream Designations
- Deer Permit Areas
- Important Bird Areas
- Terrestrial Invasive Species Observations
- Emerald Ash Borer Introduction Risk
- 2010 US Census Population Density
- Trails
- Annual Average Daily Traffic
- Annual Average Daily Vehicle Miles Traveled
- Heavy Commercial Annual Average Daily Traffic
- Heavy Commercial Annual Average Daily Vehicle Miles Traveled
- Road Functional Classes

All of these maps and corresponding tables can be viewed on the MFRC website

(www.mn.gov/frc/initiatives_llm_committees_northeast.html). Additional datasets will be posted to address new natural resources issues as they arise. Readers are encouraged to check the website for the most recent information.

Demographic Data Report

The Northeast Landscape Demographic Data Report was prepared by MFRC staff in 2013 to support the development of the Second Generation Landscape Plan. This report summarizes the best available data from the U.S. Census Bureau, U.S. Bureau of Labor Statistics, Minnesota Department of Employment and Economic Development, and Minnesota State Demographic Center on regional population and employment trends and projections. Included are major sections on population, housing, employment, earnings and income trends and projections.

A copy of the Demographic Data Report is available on the MFRC website (www.mn.gov/frc/initiatives_llm_committees_northeast.html).

Conditions and Trends Report

The Northeast Landscape Conditions and Trends Report was prepared by MFRC staff in 2013 to support the development of the Second Generation Landscape Plan. The purpose of conducting a landscape assessment was to provide a common understanding of ecological and socioeconomic conditions in order to further planning and coordination among multiple landowners and interests. This assessment information provides a scientific base for the collaborative decision making and goal development process. The Conditions and Trends Report gives as accurate a picture of the Northeast Landscape as possible given the limitations of available information and resources. Major sections of this report covered, trends in forestland cover, forestland ownership, forestland conditions and health, wildlife populations, and economic patterns. The economic section focused primarily on trends in the forest products and tourism industries.

A copy of the Conditions and Trends Report is available on the MFRC website (www.mn.gov/frc/initiatives_llm_committees_northeast.html).

C. Research Studies

Native Plant Community Geospatial Modeling

The University of Minnesota Duluth: Natural Resources Research Institute integrated soil series, vegetation relevé, geomorphic, topographic, and other relevant geospatial data layers to create rough estimates of the extent and distribution of native plant communities in the, Northern Minnesota Drift and Lake Plain, Northern Minnesota and Ontario Peatland, Northern Superior Upland, Western Superior Upland, and Southern Superior Upland ecological sections. These estimates were then used to develop System and Class-level approximations of Native Plant Community acreage by ownership. These NPC system area estimates helped to create a common framework of understanding for the Planning Committee to undertake the Northeast Landscape Plan Update.

A copy of the ‘Geospatial Modeling of Native Plant Communities of Minnesota’s Laurentian Mixed Forest’ report and MFRC developed NPC maps and data are available on the MFRC website (www.mn.gov/frc/initiatives_llm_committees_northeast.html).

Northeast Minnesota Forestry Analysis – Ten Year Projections

In 2011, the MFRC contracted with the University of Minnesota Duluth, Labovitz School of Business and Economics to update the 2002 Northern Minnesota Forestry Analysis which was used to support the development of the first generation Northeast Landscape Plan. For the 2013 contract, the Bureau of Business and Economic Research (BBER) developed two reports: the Northeast Minnesota Forestry Analysis and the Northeast Minnesota Forestry Analysis 10-year Projections. These reports supported the development of the second generation Plan's economic framework.

The first report highlighted economic data from 2009 to 2011 on select industries and served as part of the basis for specific forest-based economic goals in the revised plan. This update focused on specific elements of past forestry analysis done by the BBER, including collection and analysis of data for the following:

- An economic overview of both the Arrowhead and Northeast Regions of Minnesota.
- The economic importance of forestry to each region.
- An analysis of tourism and recreation industries with a brief comparison to forestry.

The second report contains 10-year projections, with respect to housing starts, forest-based industries value added products, output, and employment for the Northeast Landscape relating to four scenarios developed between BBER and MFRC staff and the Northeast Landscape Planning Committee. These scenarios were used to develop specific forest-based economic goals in the updated plan.

- Scenario 1: A baseline analysis that looks at current trends in harvest or removals to benchmark the change in tree species removals.
- Scenario 2: A 25 percent decrease in paper mill demand, as from an event such as a reduction in production of a paper mill.
- Scenario 3: An increase in the forest industry and, thus, an increase in harvesting of a variety of species.
- Scenario 4: An increase in the forest industry and, thus, an increase in the harvesting of biomass by 30 percent.

The Planning Committee requested MFRC staff and the research team refine the economic analysis in Scenario 3 by looking at the impacts of increasing harvest within regional 'woodsheds.' The Planning Committee recommended the regional woodsheds be defined as timberlands in the Northeast Landscape within 50 miles of the mills at Cloquet, Duluth, Grand Marais, Grand Rapids, International Falls and Two Harbors. The primary objective of the woodshed analyses was to provide estimates of growth, harvest, volume, ownership, species composition, wood quality, season of harvest, and other variables of interest to the Landscape Planning Committee. MFRC staff compiled and organized Forest Inventory and Analysis (FIA) data for the 50-mile areas for current (2007, 2008, 2009, 2010, 2011) and past (1999, 2000, 2001, 2002, 2003) conditions. For more information see:

http://mn.gov/frc/documents/council/landscape/NE%20Landscape/NE_Update_2011/Presentations/PC%20Mtg%2010/MFRC_NE_Mtg10_Turner_WoodshedAnalysis_2013-03-28.pdf

Copies of the UMD Labovitz School of Business and Economics reports are provided on the MFRC website:
(www.mn.gov/frc/initiatives_llm_committees_northeast.html).

Growing Stock Mortality in Northeast Landscape Timberland White Paper

The Northeast Landscape Planning Committee identified growing stock mortality as a significant concern in the region. Following the Committee's request for more information, MFRC staff worked with the economic work group to compile information on the issue. The primary source for timberland mortality data in this report was the Forest Inventory and Analysis (FIA) dataset and this information was organized to develop a structure for an informed group dialog and materials that could be integrated into the Northeast Landscape planning process.

A copy of the Growing Stock Mortality in Northeast Landscape Timberland White Paper is available on the MFRC website (www.mn.gov/frc/initiatives_llm_committees_northeast.html).

Northwoods Climate Change Response Framework

To meet the challenges brought about by climate change, a team of federal and state land management agencies, private forest owners, conservation organizations, and others were convened by researchers with the USDA Forest Service Northern Institute of Applied Climate Science to develop the Northwoods Climate Change Response Framework. The Climate Change Response Framework Project began in 2009 to provide information and resources for land managers in northern Wisconsin. The project's overall goals are to help land managers adapt ecosystems to changing climate, mitigate carbon emissions, respond to climate change impacts across ownership boundaries, and rapidly incorporate science and monitoring information into management activities. This project was expanded to the Northwoods Climate Change Response Framework in 2011 to include 64 million acres of Laurentian Mixed Forest within northern Minnesota, Wisconsin, and Michigan.

This effort has led to the development of two documents which were integrated into the Northeast Landscape Plan Revision.

- Forest Ecosystem Vulnerability Assessment and Synthesis (FEVAS)
- Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers (FAR).

These documents provided baseline information on the potential impacts of climate change and strategies land managers can take to account for these potential changes. The FEVAS includes vulnerability determinations for all six forested Native Plant Community Systems, in addition to two key managed forest systems (managed aspen and managed red pine).

Please refer to www.nrs.fs.fed.us/niacs/ for more information on the Northwoods Climate Change Response Framework and access the FEVAS and FAR documents.

D. Presentations

As a part of the Committee’s review of the resource base in the region, guest speakers were invited to give presentations on topics of their expertise. These powerpoint presentations are available on the MFRC website (www.frc.state.mn.us). The following is a list of presentation topics and speakers:

Presentation Topic	Presenter
December 2011	
Planning Process Kickoff	Lindberg Ekola (MFRC Staff)
MFRC NE Landscape Plan - Overview of Plans and Participants	Carissa Shively Slotterback (Humphrey School of Public Affairs, University of Minnesota) and Cindy Zerger (College of Design, University of Minnesota)
February 2012	
NE Systems Mapping and Data Needs Update	Emily Peters (Institute on the Environment, University of Minnesota)
Landscape Ecosystems and Native Plant Communities	George Host (Natural Resources Research Institute)
NE Minnesota - Fire Patterns	Peter Reich (Institute on the Environment, University of Minnesota)
Northern Minnesota Forestry Analysis [Economic]	Jim Skurla (Labovitz School of Business and Economics, University of Minnesota Duluth)
Forest Products Industry Update	Tim O'Hara (Minnesota Forest Industries), Steve Betzler (Minnesota Power), Dave Chura (Minnesota Logger Education Program)
April 2012	
Demographic Trends in the NE Region	Leslie McInenly (MFRC Staff)
Development Trends in the NE Region	Calder Hibbard (MFRC Staff)
1854 Treaty Authority	Sonny Myers (1854 Treaty Authority)
Fond du Lac Band of Lake Superior Chippewa	Steve Olson (Fond du Lac Band of Lake Superior Chippewa)
Recreation Trends in NE Minnesota	Pat Simmons (Explore Minnesota Tourism)
Social and Community Initiatives in the NE Landscape	Lisa Radosevich-Craig (Superior National Forest), Molly Thompson (Sugarloaf: The North Shore Stewardship Association), Mike Reichenbach (University of Minnesota Extension)
Harvester Handbook	Dave Wilsey (University of Minnesota Extension)
North Shore Management Board	John Bathke (Private Landowner)
May 2012	
Climate Change Trends, Uncertainty, and Projected Impacts	Chris Swanston (Northern Institute on Applied Climate Change)
Modeling Forest Management Scenarios under a Changing Climate in Northern Minnesota	Mark White (The Nature Conservancy)

Presentation Topic	Presenter
Modeling Climate Change Impacts on Forest Productivity with PnET-CN	Emily Peters (Institute on the Environment, University of Minnesota)
Climate Change Adaptation in Forestry	Stephen Handler (Northern Institute on Applied Climate Change)
Understanding Watershed Level Impacts to Streams	Sandy Verry
Fisheries Trends/Issues in NE Minnesota	Steve Persons (MN DNR Fisheries)
Game Species Trends/Issues in NE Minnesota	Tim Quincer (MN DNR Wildlife)
June 2012	
Non-Game Species Trends/Issues in NE Minnesota and Key Habitats	Bruce Carlson (MN DNR Ecological Services and Water Resources)
Trends Exploration	Carissa Schively Slotterback (Humphrey School of Public Affairs, University of Minnesota)
September 2012	
Native Plant Community Mapping	George Host (Natural Resources Research Institute)
Minnesota Science Team Updates	Clarence Turner (MFRC Staff – MN DNR Forestry)
NE Landscape Trends Workshop Summary	Cindy Zerger (College of Design, University of Minnesota)
October 2012	
Mining in Minnesota: Mineral Resource Activities in Northeastern Minnesota	Dennis Martin
Overview of Environmental Review and Permitting for Metallic Mines in Minnesota	Jennifer Engstrom (MN DNR Lands and Minerals)
Northeast Landscape Committee - Resource Review	Clarence Turner (MFRC Staff – MN DNR Forestry)
February 2013	
Climate Change and NE Forests	Clarence Turner (MFRC Staff – MN DNR Forestry)
High Conservation Value Forests Update	Rebecca Barnard (MN DNR Forestry)
March 2013	
DNR Strategic Land Asset Management	Bob Tomlinson (MN DNR Land Asset Management)
Northern Minnesota Forestry Economic Analysis	Jim Skurla (Labovitz School of Business and Economics, University of Minnesota Duluth)
Climate Change and NE Forests Update	Clarence Turner (MFRC Staff – MN DNR Forestry)
Woodshed Analysis	Clarence Turner (MFRC Staff – MN DNR Forestry)

E. Forest Policies

Forest Policy Inventory Report

Eleven local plans were examined to identify common themes in the Northeast Landscape Forest Policy Inventory Report. The main task in preparing this report was to inventory and highlight the landscape issues, visions, goals, and strategies adopted in local planning documents developed for local units of government and resource agencies in Northeast Minnesota. The documents in this inventory include

1. Superior National Forest Land and Resource Management Plan (2004)
2. Fond du Lac 2008 Integrated Resource Management Plan (2008)
3. DNR - Border Lakes Subsection Forest Resources Management Plan (2005)
4. DNR - Mille Lacs Uplands Subsection Forest Resources Management Plan (2008)
5. DNR - North Shore Highlands, Toimi Uplands, Laurentian Uplands Subsection Forest Resources Management Plan (2004)
6. DNR - St. Louis Moraines, Tamarack Lowlands, Nashwauk Uplands, and Littlefork-Vermillion Uplands Subsection Forest Resources Management Plan (2010)
7. Carlton County Management Plan for Tax-Forfeited Lands (2004)
8. Lake County Forest Management Plan (2007)
9. St. Louis County Land Department Long-Term Resource Management Plan (2006)
10. St. Louis County 2010-2012 Land Department Business Plan (2010)
11. Cook County Wildfire Protection Plan (2009)

Common themes were identified and goals and strategies were consolidated under each theme. The twelve major themes identified in the study included:

1. Forest health, productivity, and regeneration
2. Regional tourism, visual quality, and cultural resources
3. Sustainable timber harvest
4. Maintenance of rare native plants and ecosystems
5. Enhanced wildlife populations and habitat
6. Biological diversity of forests in terms of species, age, structure, and spatial arrangement
7. Forest patch size and connectivity
8. Extractives and non-timber commodities
9. Air, soil, and water quality
10. Monitoring, research, and data management
11. Inter-agency coordination of management efforts
12. Assist landowners and the general public in making informed management decisions through education and planning involvement.

The document also identified three themes expressed in Northeast Landscape Planning Committee meetings not highlighted extensively in the summarized plans which included: urban-wildland interface fire management, invasive species, and climate change.

The themes and corresponding goals and strategies developed by local units of government and resource agencies working in the region provided the Committee with a foundation to build the strategic policy framework in Part 2 of this Plan.

A copy of the Forest Policy Inventory Report is available on the MFRC website (www.mn.gov/frc/initiatives_llm_committees_northeast.html).

Other Forest Policy Sources for Development of the Plan

The Committee referred to many sources as they created and refined the desired future conditions and policy framework for this Plan. The following is a list of policy documents that they consulted:

- Sustainable Forest Resources Act.
- MFRC organizational vision and goal statements.
- Other MFRC landscape plans (East Central, North Central, Northern, West Central and Southeast landscapes).
- DNR forestry plans – subsection plans, area plans, etc.
- A Strategic Conservation Agenda 2003 – 2007, DNR.
- Governor’s Task Force Report on the Competitiveness of Minnesota’s Primary Forest Products Industry.

Section 4

Conditions and Trends Summary



This section of the Plan provides a summary of the forests across the Northeast Landscape by providing information about resource conditions and trends. The SFRA requires the MFRC and its regional committees give equal consideration to the long-term economic, ecological, and social needs and limits of the state's forest resources. The Northeast Planning Committee addressed this legislative directive by organizing the strategic policy framework into seven Resource Topics (Note: These are not listed in order of importance):

- A. Forest Land Base
- B. Vegetation and Terrestrial Wildlife
- C. Water Resources and Aquatic Wildlife
- D. Forest Products
- E. Recreation
- F. Minerals
- G. Social and Cultural Uses and Values

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Each of these Resource Topics includes relevant ecological, economic, and social components to meet the requirements of the SFRA.

For more a more complete review of the conditions and trends in the Northeast Landscape please review the background documents on the MFRC website including the Conditions and Trends Report, Resource Atlas, and Demographic Data Report.

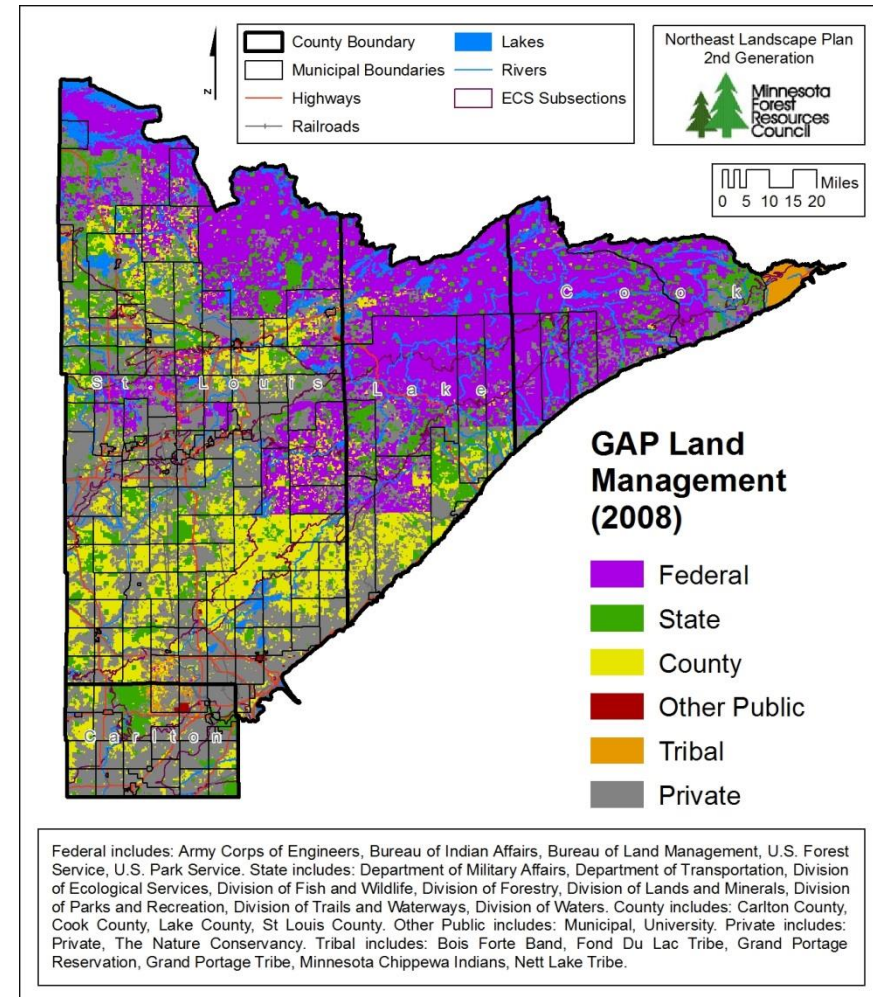
A. Forest Land Base

Forestland Ownership and Development

The Northeast Landscape is known for its expansive and relatively intact forest. Roughly 85% of the region is forested and only about 200,000 acres of upland forest has been lost to land development and agricultural uses since European settlement. Developed land estimates increased by 4,850 acres per year from 1992 to 2006 and mining, residential, and recreational development present growing threats to this forested landscape. These pressures are somewhat mitigated by the high percentage of public land. Approximately 65% of the total land and 71% of the forest land is publicly owned. This public forestland is not evenly distributed across the landscape; with a general pattern of greater public ownership to the north and east. This public land is divided between several management agencies with varying goals and objectives.

Potential changes in regional landownership patterns include the possible sale of industrial, tax-forfeit, and school trust forestlands. Selling portions of these land holdings will lead to increased parcelization and diversified landownership with potential positive and negative impacts on the ecology of the region and future forest management options. Proposed mining expansion in the region could also alter land ownership and use patterns.

Land Management Type	Acres	% of Total
Federal	2,531,480	34.4
State	986,881	13.4
County	1,178,378	16.0
Other Public	16,235	0.2
Tribal	75,049	1.0
Private	2,575,621	35.0
Total Area	7,363,644	100.0
Source: Minnesota DNR GIS Data Deli		

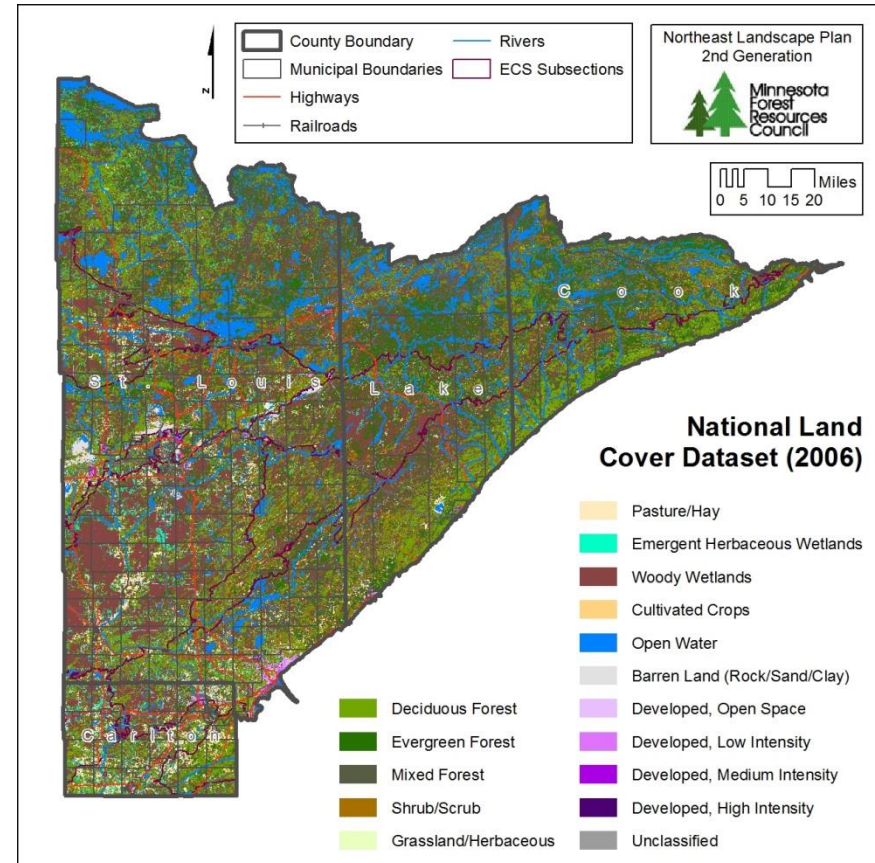


Regional Land Utilization

Forests are the dominant land cover in the Northeast Landscape with roughly 85% of the region forested. The spatial distribution of land cover classifications shows a majority of the lowland vegetation existing in the western portion of the landscape with upland forest across the northern and eastern portions of the landscape. Agriculture is a relatively minor component of the regional land use and has declined by approximately 85% across the landscape from 1992 to 2006. Mining represents only about 1.1% of the region's total land cover, but is concentrated in the Mesabi Range and represents a major land use locally.

There is a general pattern in land use of more reserved forestlands in the northern and eastern portions of the region and more utilitarian management of forestland in the south and west. This pattern has developed a general arrangement of increasing outdoor tourist economy in the north and eastern portions of the region and a heavier focus on timber production in the southern and western portions of the Northeast Landscape.

Regional population and land use patterns may change significantly with mine expansion. Under maximum expansion scenarios total mining employment could increase from roughly 4,000 jobs to 9,600 jobs, leading to additional pressures on the region's forests through mining and rural residential development. Increased rural residential development would make future fire suppression efforts more challenging in the region.



B. Vegetation and Terrestrial Wildlife

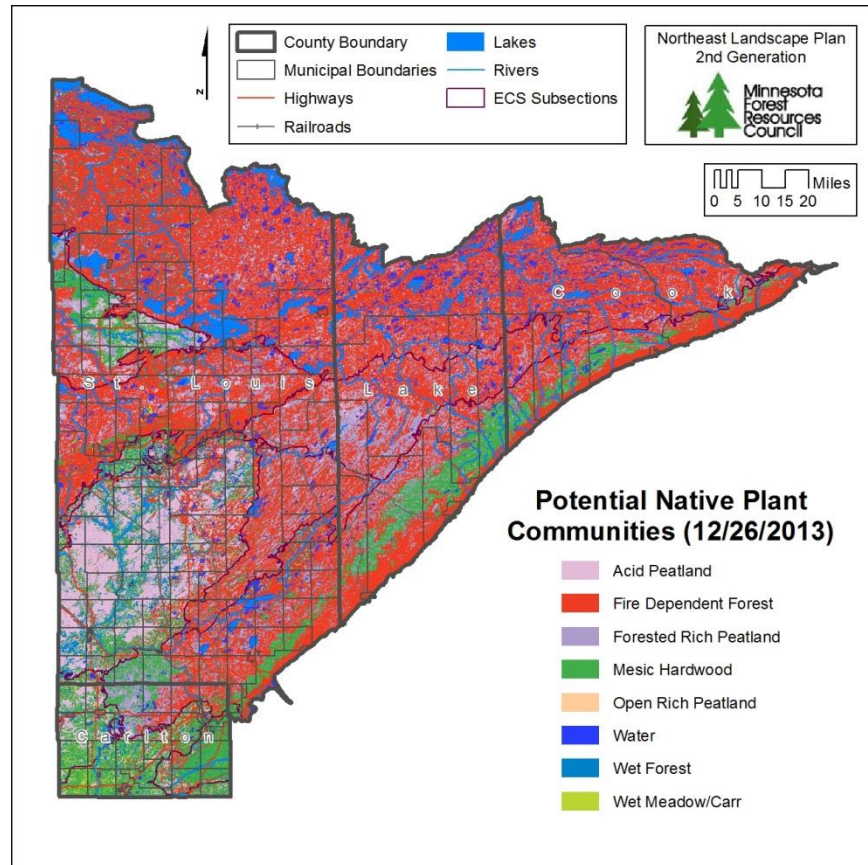
Vegetation Summary

The Northeast Landscape covers 7.3 million acres and is located entirely within the Laurentian Mixed Forest Province. Nearly two thirds of the region consists of upland forest NPC systems. Eighty-two percent of this upland forestland and 51% of the entire region is classified as Fire-Dependent Forest. Overall the region contains three lowland forest (Acid Peatland, Forested Rich Peatland, and Wet Forest) and two upland forest (Fire Dependent Forest and Mesic Hardwood) NPC Systems. These systems are classified and described by considering vegetation, hydrology, landforms, soils, and natural disturbance regimes.

The tree species, age composition, and patch size of the ecological communities in the Northeast Landscape have changed since European settlement. This changed condition affects the habitat and species composition on the landscape. This includes a large decrease in the abundance of long-lived conifers (white pine, white cedar, white spruce, upland black spruce) and hardwoods (yellow birch). Species and age compositions have also changed in the last decade with the average age of forests in the Northeast Landscape getting older in recent FIA assessments.

The Natural Resources Research Institute integrated a series of geospatial data layers to create rough estimates of the extent and distribution of potential native plant communities using the Minnesota DNR's 2003 NPC classification system. Within each NPC system are NPC Classes, Types, and Subtypes that can be useful in guiding the restoration of natural processes and native vegetation that evolved in these ecosystems. This information is also used to inform land managers on the range of suitable tree species for specific sites in relation to the tree's ability to become merchantable given the ecological site conditions.

Section 7 and Appendix D contain more information on Native Plant Communities in the Northeast Landscape.



Northeast Landscape Potential NPC System Estimates.			
Code	NPC System	Acres	Percent
AP	Acid Peatland	588,757	8.0
FD	Fire Dependent Forest	3,756,337	51.0
FP	Forested Rich Peatland	1,111,295	15.1
MH	Mesic Hardwood	839,194	11.4
OP	Open Rich Peatland	1,113	0.0
Water	Water	615,814	8.4
WF	Wet Forest	311,696	4.2
WM	Wet Meadow / Carr	137,291	1.9
	Total	7,361,497	--
Source: Natural Resources Research Institute – UM Duluth			

Wildlife and Wildlife Habitat

The large contiguous forests of the Northeast Landscape provide habitat for many of the state’s amphibian, reptile, fish, bird, and mammal and invertebrate species. This forested ecosystem contains as many as 31 of the state’s 50 amphibians and reptiles, 63 of the 78 mammals, and 127 of the state’s 150 forest associated breeding birds. Many forest wildlife species populations appear stable or increasing while some species have experienced population declines.

Population survey numbers for the northeast Minnesota moose herd have varied in the years of the Northeast Landscape Plan development, however, long term trends and population indices (e.g. age/sex ratios, recruitment, and mortality) suggest a continuing decline. The exact causes of moose mortality are not well understood but ongoing research supports the need for diverse and healthy forests.

White-tailed deer were historically rare to absent in northeastern Minnesota and while the area still has some of the lowest deer densities in the state; deer densities in certain locations (e.g. Lake Superior’s North Shore) do become large enough to greatly limit desirable forest regeneration.

The Northeast Landscape has two federally listed or proposed species under the Endangered Species Act. Northeastern Minnesota’s abundant and diverse mixed conifer-hardwood forest is the primary habitat and range in the eastern United States for Canada lynx (threatened). Northern long-eared bat, a forested habitat and cave-hibernating species is currently proposed for federal listing.

Minnesota law requires the Department of Natural Resources to recommend a list of Endangered, Threatened, and Special Concern species to the Minnesota legislature. The legislature has approval authority over the list; once the list is approved the DNR administers the law. The state’s List of Endangered, Threatened, and Special Concern Species was first established in 1984, updated in 1996, and updated again in 2013. The current state list of amphibian, reptile, fish, bird, and mammal and invertebrate species has two Endangered, three Threatened, and twenty-four Special Concern species in the DNR Northeast Region (which includes, but is larger than the Northeast Landscape). More information on this list is available at www.dnr.state.mn.us/ets/index.html. In addition, the USDA Forest Service manages and conserves Regional Forester Sensitive Species.

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Climate Change

Forest ecosystems in northern Minnesota are projected to be affected by climate change (Handler et al. 2013). Although the impacts of climate change on a specific location will be influenced by variety of factors, including site conditions, forest health, and past management, forest systems which are adapted to a narrow range of conditions or contain few species are expected to be more vulnerable than communities adapted to a wide range of conditions or those with higher diversity. In general, projected climate change is likely to lead to declines in the region's boreal species like balsam fir, black spruce, and quaking aspen while species adapted to warmer drier climates like oaks may do better. Overall vulnerability determinations for Native Plant Community Systems range from low-moderate (Floodplain Forests) to high (Wet Forests, Forested Rich Peatlands, and Acid Peatlands) although local characteristics may amplify or buffer these expected vulnerabilities. Additionally, the indirect effects of climate change, such as longer growing seasons or increased insect pest activity, may create new beneficial or stressful interactions.

Climate change projections also indicate precipitation may increasingly come in large pulses and as rain rather than snow which will have dramatic impacts on the region's hydrology, water temperature, and water quality. The combination of these changes to terrestrial and aquatic systems poses a significant threat to the region's native biodiversity.

For more information on climate change in northeastern Minnesota, please refer to Appendix D of the Northeast Landscape Plan and the Forest Ecosystem Vulnerability Assessment and Synthesis (FEVAS) and Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers (FAR) at www.nrs.fs.fed.us/niacs/.

Climate change vulnerability determination summaries for the forest systems analyzed in the Forest Ecosystem Vulnerability Assessment and Synthesis.					
Forest System	Potential Impacts	Adaptive Capacity	Vulnerability	Evidence	Agreement
Fire-Dependent Forest	Negative	Moderate-High	Moderate	Medium	Medium
Mesic Hardwood Forest	Moderate	Moderate-High	Moderate	Medium	Medium
Floodplain Forest	Moderate-Positive	Moderate	Low-Moderate	Limited-Medium	Medium
Wet Forest	Negative	Low	High	Limited-Medium	Medium
Forested Rich Peatland	Negative	Low	High	Medium	Medium-High
Acid Peatland	Negative	Low	High	Medium	Medium-High
Managed Aspen	Moderate-Negative	Moderate	Moderate-High	Medium	High
Managed Red Pine	Moderate-Negative	Moderate-Low	Moderate-High	Medium	Medium
Source: Handler et al. 2013; Forest Ecosystem Vulnerability Assessment and Synthesis (FEVAS)					
Note: More information on native plant communities can be found at: www.dnr.state.mn.us/npc/classification.html					

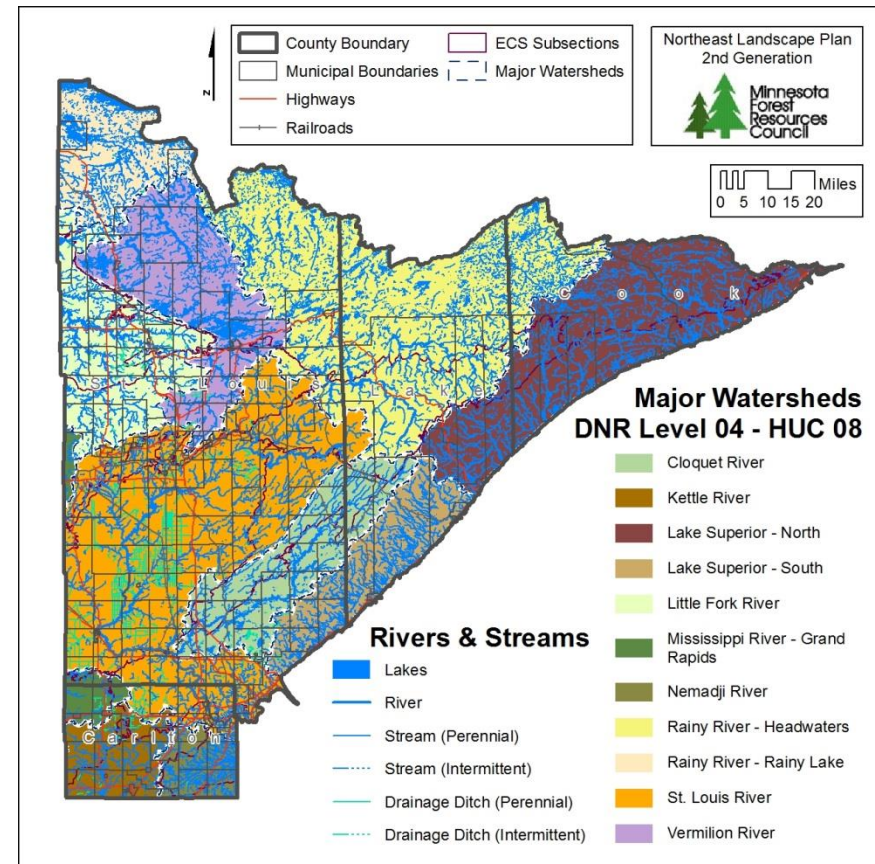
C. Water Resources and Aquatic Wildlife

The Northeast Landscape is famous for high quality water resources with over 2,600 lakes covering nearly 525,000 acres, more than 150 miles of Lake Superior shoreline, and over 10,000 miles of streams and rivers. The region's watersheds contain relatively low amounts of open land and have some of the best Watershed Health Assessment (MN DNR) scores in the state. Water in this region flows north through the Rainy River to Hudson Bay, east through the Great Lakes to the Atlantic Ocean, and south through the Mississippi River to the Gulf of Mexico. Forest management practices within them can directly affect stream and lake health.

Forestlands can be a great storm filter and are a key component in sustaining high quality water and hydrology. Forests buffer rains and hold soil in place which allows moisture to seep into the ground and therefore reduce erosion and runoff. Beyond just having forest cover, the age distribution of forests within a watershed, has an impact on water quality through effects on peak flows, loss of base flow, sedimentation and erosion, turbidity, nutrient levels, and water temperatures. These effects in turn can impact the health and distribution of biota within the watershed.

According to the MN DNR's Watershed Health Assessment Framework, the waters of northeastern Minnesota are healthier than many other regions of the state; however, all watersheds at the Hydrologic Unit Code (HUC) level 08 have some degree of impairment as do many smaller sub-watersheds and important stream catchments. The basis for most of the impairment determinations in lakes and streams in the Northeast Landscape is elevated mercury level in fish tissue.

More information about impaired waters in Minnesota can be found at: www.pca.state.mn.us/



D. Forest Products

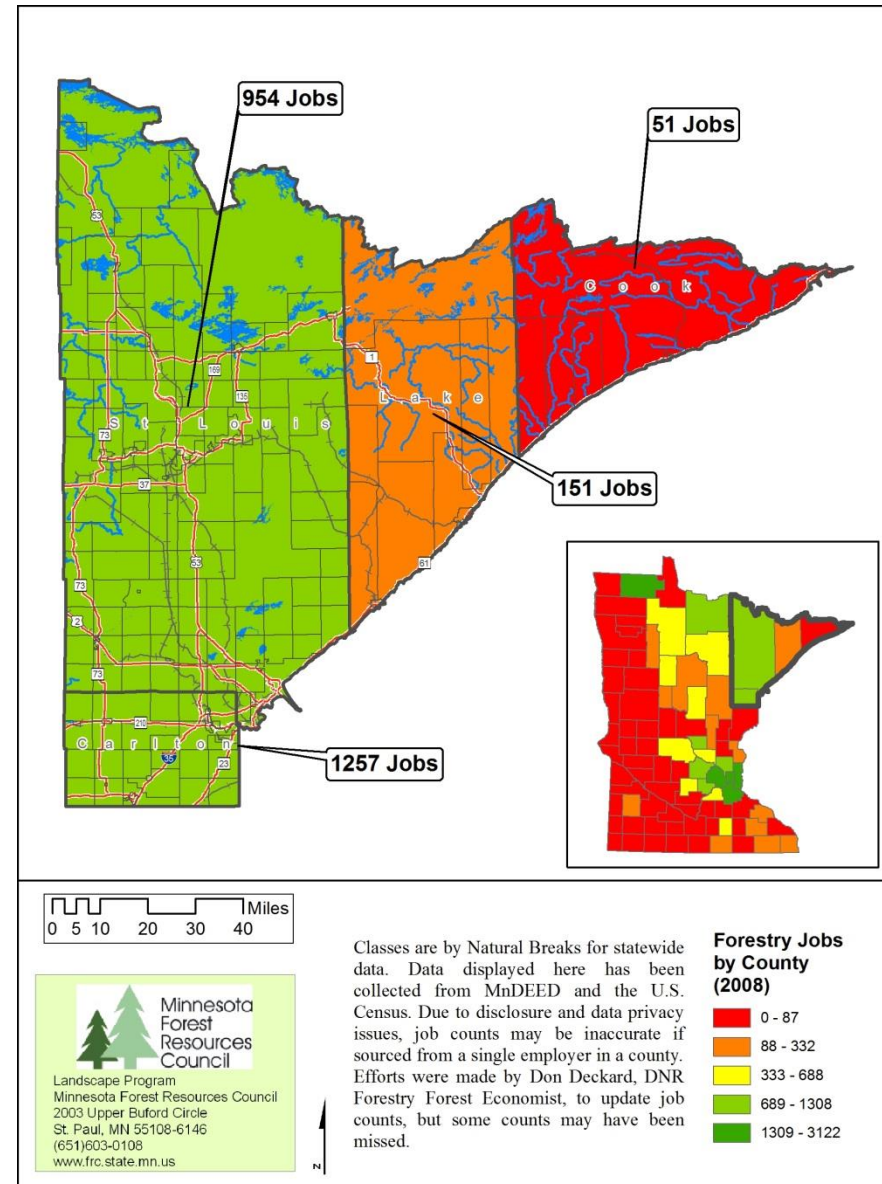
Roughly 85 percent of the Northeast Landscape is forested with a mix of species dominated by aspen-birch and spruce-fir forest types (44.0% and 30.2 % respectively). This abundant forest resource has led to the establishment of several forest products facilities throughout the region. Nearly 825,000 cords were harvested from the Northeast Landscape in 2008 (approximately 31% of the statewide harvest); however, mills in the Northeast Landscape, and those with procurement areas within the four county area, report consumption of nearly 2 million cords annually (the difference is imported from other regions of Minnesota, surrounding states, and Canada).

The forest products manufacturing and related sectors directly supported an estimated 2,400 jobs within the four county boundary in 2008; there are also major forest products employers such as Boise located just outside the Northeast Landscape border.

Paper mills, commercial logging, and reconstituted wood products dominate the forest products sectors in the Northeast Landscape, with value added and output for these top three sectors accounting for almost 95% of all forestry-related dollars and 89% of the total forestry-related jobs. However, in terms of value added and output, only paper mills showed growth in both 2009 dollars and deflated dollars (to 1998 dollars) with other sectors remaining fairly flat or declining from 1998 to 2009. Job losses were also observed across the region from 1998 to 2009 in nearly all the forest product sectors.

For more information on the forest products economy see the UMD Labovitz School of Business and Economics reports on the MFRC Website:

http://mn.gov/frc/initiatives_llm_committees_northeast.html



Comparable sectors (IMPLAN analysis)	Value Added (Million \$)			Output (Million \$)			Employment		
	1998	2009	Unadjusted % change*	1998	2009	Unadjusted % change*	1998	2009	Unadjusted % change*
Paper mills	\$122.7	\$187.8	53%	\$322.7	\$690.5	114%	1,228	963	-22%
Reconstituted wood product mfg	\$84.5	\$65.4	-23%	\$224.8	\$102.9	-54%	843	343	-59%
Commercial logging	\$22.9	\$20.5	-11%	\$64.6	\$60.9	-6%	397	527	33%
Sawmills and wood preservation	\$10.9	\$3.9	-64%	\$43.3	\$15.4	-64%	271	69	-75%
All other miscellaneous wood product mfg	\$9.7	\$7.0	-28%	\$20.9	\$14.1	-33%	241	85	-65%
Forestry, forest products, and timber tract production	\$2.6	\$1.6	-38%	\$5.1	\$3.0	-41%	91	5	-95%
Engineered wood member and truss mfg	\$2.4	\$0.3	-88%	\$7.1	\$0.7	-91%	64	5	-93%
Wood kitchen cabinet and countertop mfg	\$1.8	\$1.7	-6%	\$4.0	\$5.1	27%	53	41	-22%
Nonupholstered wood household furniture mfg	\$0.5	\$0.0	-100%	\$1.8	\$0.0	-100%	26	0	-100%
Showcase, partition, shelving, and locker mfg	\$0.1	\$0.8	737%	\$0.2	\$2.3	839%	2	14	603%
Total	\$258.2	\$289.0	12%	\$694.6	\$894.9	29%	3,216	2,052	-36%
Source: "Northern Minnesota Forestry Analysis, 2011" prepared by the Bureau of Business and Economic Research at the University of Minnesota Duluth Labovitz School of Business and Economics									
*Because various sectors in the 1998 data have been aggregated or split in the data sectoring for 2009, only sector change "best match" comparable sectors are used for this calculation.									

Biomass

Biomass is generally defined as living and recently dead biological material that can be used as fuel or as a raw material for industrial production. The Minnesota DNR Division of Forestry's Biomass Program deals specifically with woody biomass. Woody biomass includes logging residue (non-merchantable tops and limbs left over from commercial timber harvests, non-merchantable small-diameter trees and stems, dead standing trees, and down logs), primary and secondary mill residue, dedicated energy crops, urban forest clearing material, land-clearing material, and brushland material. More information can be found at: www.dnr.state.mn.us/forestry/biomass/index.html

Nearly 700,000 green tons (about 350,000 cds) of forest derived material was used for energy by biomass facilities statewide in 2012 and a significant portion of this utilization was in the Northeast Landscape. Minnesota has established a lead role in ensuring the sustainability of biomass harvests through Biomass Harvesting Guidelines and a well-structured Master Logger Program to ensure the use of these guidelines.

Economic modeling suggests that a direct value added impact of \$12.1 million and total economic impact of over \$15.8 million could be accomplished with moderate expansion of biomass utilization for power generation and biochemical products (Skurla et al. 2013). This expansion could also add an additional 54 jobs to the region.

Timber Demand and Use

As a result of recession-induced mill closures and the resulting decline in timber prices, the volume of pulpwood harvested in the region declined by over 35 percent from 2005 to 2010. The decline in harvest was driven by the decline in demand however a notable result of the harvest decline is how it has played out by ownership. During this time there was a significant decline in harvest of private and tribal forests. Harvest volume from private and tribal ownership decreased from 55% of total all-ownership harvest volume in 2005 to 34% in 2012. Meanwhile the volume of timber harvested from public land has stayed relatively constant in terms of absolute volume but has increased from 45% to 66% of total all-ownership harvest volume. There is still a significant regional demand despite the economic downturn and decline in harvest. Mills with procurement areas within the Northeast Landscape reported utilization of nearly 2 million cords of sawlogs and pulpwood annually. This is more than 2/3 of the total statewide harvest.

City	County	Mill	Wood Used ¹	Product ¹	2012 Reported Consumption ² (Cords)
Cloquet	Carlton	SAPPI	Ash, Aspen, Birch, Maple, Pine	Coated freesheet fine printing and publication paper, market pulp	866,603
			Ash, Aspen, Birch, Maple	Chemical cellulose	
		Jarden Home Brands, Inc.	Aspen, Paper Birch	Matches	3,689
Duluth	St. Louis	NewPage	Balsam Fir, Spruce, small amount of Pine	Uncoated, lightweight super calendered magazine and publication papers	140,601
Grand Marais	Cook	Hedstrom Lumber	Aspen, Jack Pine, Red Pine, White Pine, White Spruce	Lumber	29,019
Grand Rapids	Itasca	UPM Blandin	Aspen, Balsam Fir, Basswood, Spruce	Lightweight coated publication papers	200,247
International Falls	Koochiching	Boise Inc.	Aspen, Balsam Poplar, Pine, Spruce, Balsam Fir, Birch, Tamarack, Ash, Maple	Office papers, label and release papers, base sheets, business and specialty printing grades	543,454
Two Harbors	Lake	Louisiana-Pacific Corp.	Aspen, Balsam Poplar, Birch	OSB Siding	95,260
Total					1,878,873

¹ Minnesota DNR Division of Forestry; Minnesota's Forest Resources 2012.

² Minnesota Department of Labor and Industry; Reporting required under Minn. Stat. § 176.130, Targeted Industry Fund - Loggers.

Note: Data represents roundwood consumption only and does not include residual chips purchased from sawmills.

E. Recreation

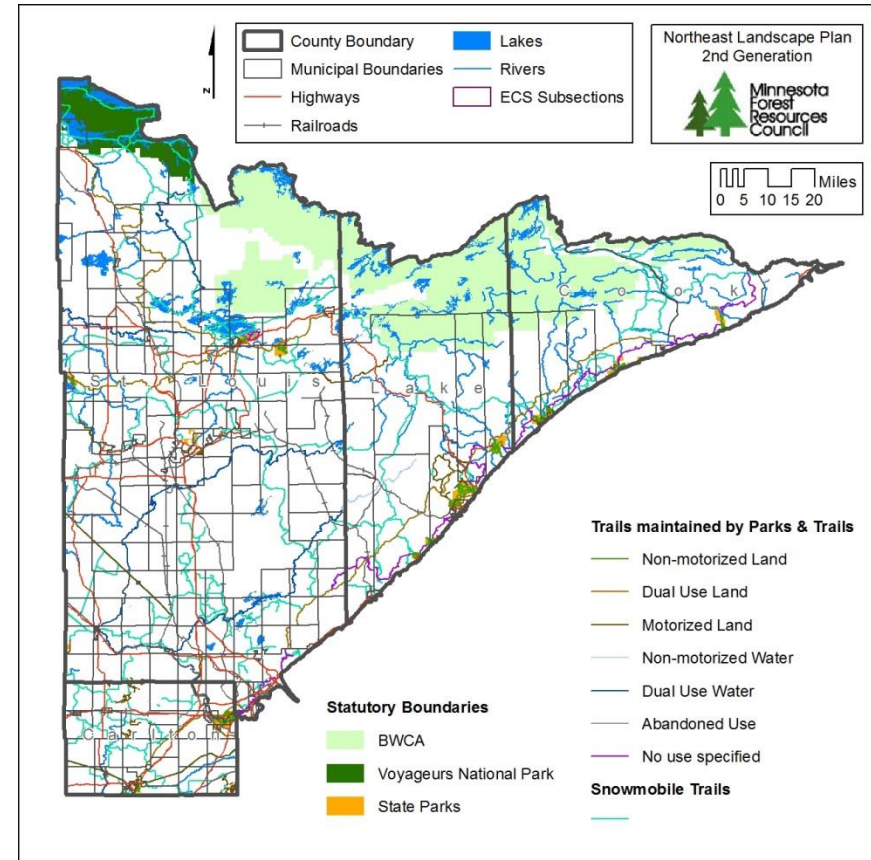
The Northeast Landscape is a major forest recreation destination with a wide variety of nationally recognized outdoor recreation opportunities. Tourism and recreation is a substantial and growing component of the regional economy with these sectors generating over \$825 million in economic output and nearly 15,000 full-time equivalent jobs in 2011.

Outdoor recreation opportunities are important both socially and economically to the people, communities, and industry throughout the region but are especially important to the economy of northern and eastern portions of the landscape. These are regionally and nationally unique resources that depend on diverse forest systems capable of supporting a range of tourism and outdoor recreation activities.

The ecological setting of the area provides the base for recreational opportunities. Geologic features and topography provide scenic views, rock climbing, and skiing opportunities. Abundant lakes, rivers, and wetlands provide water-based recreation in the form of boating, canoeing, fishing, and waterfowl hunting and habitats for a variety of wildlife species. The combination of land and water-based ecosystems ensure habitat for many species. This abundance and variety of habitats contribute to the increasingly popular recreational pursuit of wildlife watching. The mix of pine, spruce, birch, aspen, and other forest types when coupled with the water features provide a “northwoods” setting attractive to camping, hiking, backpacking, biking, ATVing, and other outdoor pursuits.

Dramatic seasonal temperature changes and conditions allow for a change to winter based recreation including alpine and Nordic skiing, snowboarding, ice fishing, snowshoeing, snowmobiling, and dog sledding. And finally, the existing infrastructure, in terms of paved, graveled, and native surfaced roads, as well as resorts, hotels, ski lodges, outfitters, campgrounds, trails, trailheads, picnic areas, and other developments and businesses allow access to a wide spectrum of recreational pursuits.

The region features thousands of miles of trails for a multitude of uses including the nationally renowned 296-mile Superior Hiking Trail that follows the rocky ridgeline above Lake Superior from Duluth to the Canadian border which has been listed as one of the five best hikes in America by Reader’s Digest.



There are fourteen Minnesota State Parks within the Northeast Landscape which include: Bear Head Lake, Cascade River, George Crosby Manitou, Gooseberry Falls, Grand Portage, Jay Cooke, Judge C.R. Magney, McCarthy Beach, Moose Lake, Savanna Portage, Soudan Underground Mine, Split Rock Lighthouse, Temperance River, and Tettegouche. These parks have annual visitation in excess of 2.2 million and brought in over \$1.6 million in total sales in 2012. There are also five State-Designated Trails, six State-Designated Water Trails, and fifteen State Forests in the Northeast Landscape.

The Northeast Landscape also contains the Superior National Forest, Grand Portage National Monument, and nearly all of Voyagers National Park. The Superior National Forest estimated roughly 1.5 million site visits in 2011 and is home to the Boundary Waters Canoe Area Wilderness (BWCAW), which is the most visited wilderness in the United States with nearly 111,000 overnight visitors in 2011.

This region also contains high quality water resources with over 2,600 lakes covering nearly 525,000 acres, more than 150 miles of Lake Superior shoreline, and over 10,000 miles of streams and rivers which attract visitors and residents to the region for their outstanding scenery and recreation opportunities. These resources support many forms of recreation; however, survey data available from some areas suggest that one form, angling, has shown little change over the past 15 years. Fishing pressure on some large lakes, and on lakes in Cook County, has been stable or declining, and fishing pressure on inland streams in Cook County has declined. Fishing pressure on Lake Superior has been stable since 1994.

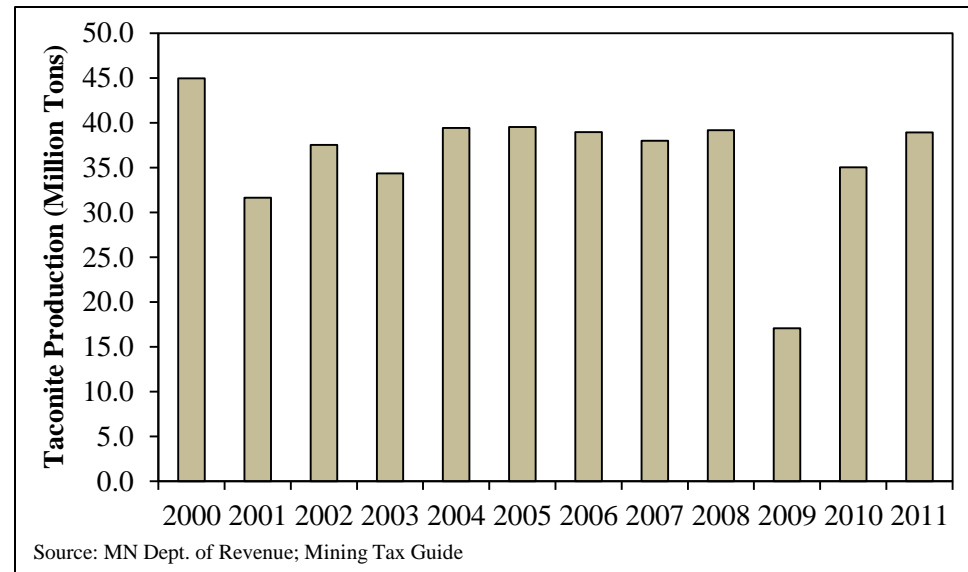
The Northeast Landscape contains a wide range of outdoor recreation based amenities including 25 percent of all resorts in Minnesota. Other developed amenities include numerous hotels and outfitters, three downhill ski resorts (Spirit Mountain, Lutsen Mountain, Giants Ridge), and the North Shore Scenic Railroad between Duluth and Two Harbors.

Tourism and recreation sectors based on 2011 IMPLAN analysis	Value Added	Output	Employment
Food services and drinking places	\$245,861,696	\$494,622,880	9,740
Hotels and motels, including casino hotels	\$72,869,120	\$160,516,224	1,742
Amusement parks, arcades, and gambling industries	\$18,933,070	\$39,470,412	615
Other amusement and recreation industries	\$15,569,572	\$26,438,140	591
Museums, historical sites, zoos, and parks	\$14,631,979	\$26,781,522	230
Other accommodations	\$14,352,058	\$32,323,726	439
Automotive equipment rental and leasing	\$7,792,549	\$12,809,813	60
Performing arts companies	\$3,620,876	\$8,377,862	327
Promoters of performing arts and sports and agents for public figures	\$2,668,829	\$9,836,482	232
Fitness and recreational sports centers	\$2,577,699	\$5,324,226	173
Independent artists, writers, and performers	\$1,658,814	\$5,420,264	97
Bowling centers	\$1,634,467	\$2,536,585	74
Spectator sports companies	\$217,282	\$1,378,664	52
Total	\$402,388,011	\$825,836,800	14,371
Source: “Northern Minnesota Forestry Analysis, 2011” prepared by the Bureau of Business and Economic Research at the Labovitz School of Business and Economics – University of Minnesota Duluth			

F. Minerals

Mining is a major economic driver in the Northeast Landscape and is the dominant economic engine in the communities of north central St. Louis County.

Minnesota is the largest producer of iron ore and taconite in the United States, and much of this is found in the Northeast Landscape. Advances in technology have found a use for a lower grade iron ore, called taconite. The taconite is crushed, processed into hard, marble-sized pellets, and shipped to steel mills. Total taconite production for the seven operating Iron Range taconite plants has remained relatively steady around 38 million tons from 2000 to 2011 with the exception of 2009 when production dipped to 17.1 million tons.



Copper-nickel mining exploration is also ongoing in the region. One proposal to begin copper-nickel mining in the Northeast Landscape within the timeframe of this plan (Polymet) is in the permitting process. At least a few other mining companies have shown committed interest in starting up other Cu-Ni mines within the Landscape. Development of mining for these and other precious metals has the potential for many new jobs in the region; however, this has raised water quality concerns since these metals are found in a sulfur containing ore and to extract these metals, mining operations need to deal with the sulfur. A chemical reaction occurs once sulfur is exposed to oxygen and water which creates, among other things, more acidic water and the potential for water pollution. The mining corporations have proposed ways to mitigate for these potential issues.

Current mining in Minnesota accounts for just over 4,000 direct employment jobs, however, the total economic impact of the projected largest possible increase in ferrous and non-ferrous (copper-nickel) mining production could account for almost \$5 billion in total value added, almost \$7.8 billion in total output, and 9,600 direct employment jobs (Skurla et al. 2012).

Total Ferrous and Non-Ferrous (Expansions, New Projects, and 2010 Baseline Operations)				
	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Value Added (Million \$)	\$2,993.1	\$891.4	\$1,109.2	\$4,993.6
Output (Million \$)	\$4,442.4	\$1,535.4	\$1,804.1	\$7,781.8
Employment	9,606	5,644	12,073	27,323
Source: "The Economic Impact of Ferrous and Non-Ferrous Mining on the State of Minnesota, the Arrowhead Region, including Douglas County, WI"; November 2012; prepared by the Bureau of Business and Economic Research at the Labovitz School of Business and Economics, University of Minnesota Duluth				

G. Social and Cultural Uses and Values

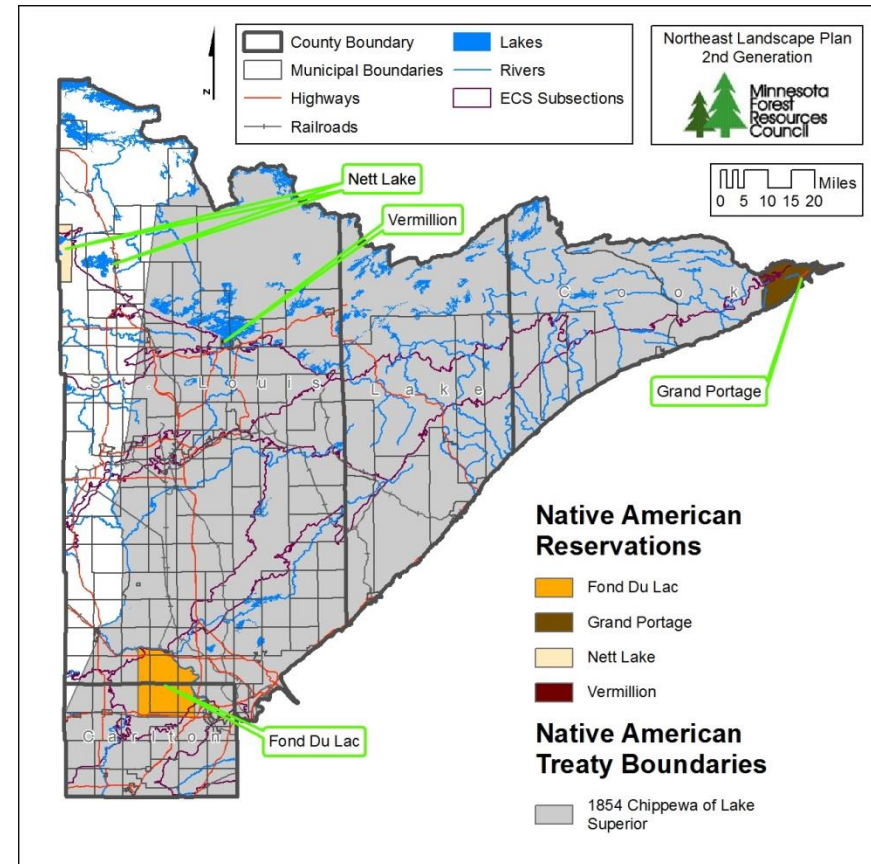
Native American Cultural Traditions

There are three Bands of Chippewa (Ojibwe) in the region: Bois Forte, Grand Portage, and Fond du Lac Bands. These bands have a long tradition of cultural uses of the forests and forest-dependent fish and wildlife species in this region. The Fond du Lac Reservation is in the southwestern portion of the region straddling the Carlton-St. Louis County line; the Grand Portage Reservation occupies the far northeastern tip of the region; and the Bois Forte Reservation is divided into three sectors: Nett Lake, Vermilion, and Deer Creek. The Vermilion section is located near the town of Tower, the Nett Lake section is located on the St. Louis-Koochiching County line and the Deer River sector is in Itasca County.

The Bands maintain off-reservation hunting, fishing, and gathering rights in the 1854 Ceded Territory. These tribal resources are maintained by the Bands and regional organizations such as the 1854 Treaty Authority. The 1854 Treaty Authority is an inter-tribal natural resources management organization that implements the off-reservation rights of the Grand Portage and Bois Forte Bands. The Fond du Lac Band, which is not part of the 1854 Treaty Authority, looks after its own treaty rights within the ceded territory.

Traditional Ojibwe people used native plants for food, pharmaceuticals, dyes, tools, construction, basketry, and transportation. New developments have resulted in many substitutes to replace these traditional native plants. However, many Ojibwe people continue to manage for, harvest, and use native plants in the traditional manner with activities such as wild rice harvesting, ash basket making, birch bark crafting, and maple sugar collection.

In addition, northern white cedar is one of the four sacred plants to Ojibwe people and is used in a number of medicinal and spiritual activities along with the other sacred plants: tobacco, sage, and sweet grass.



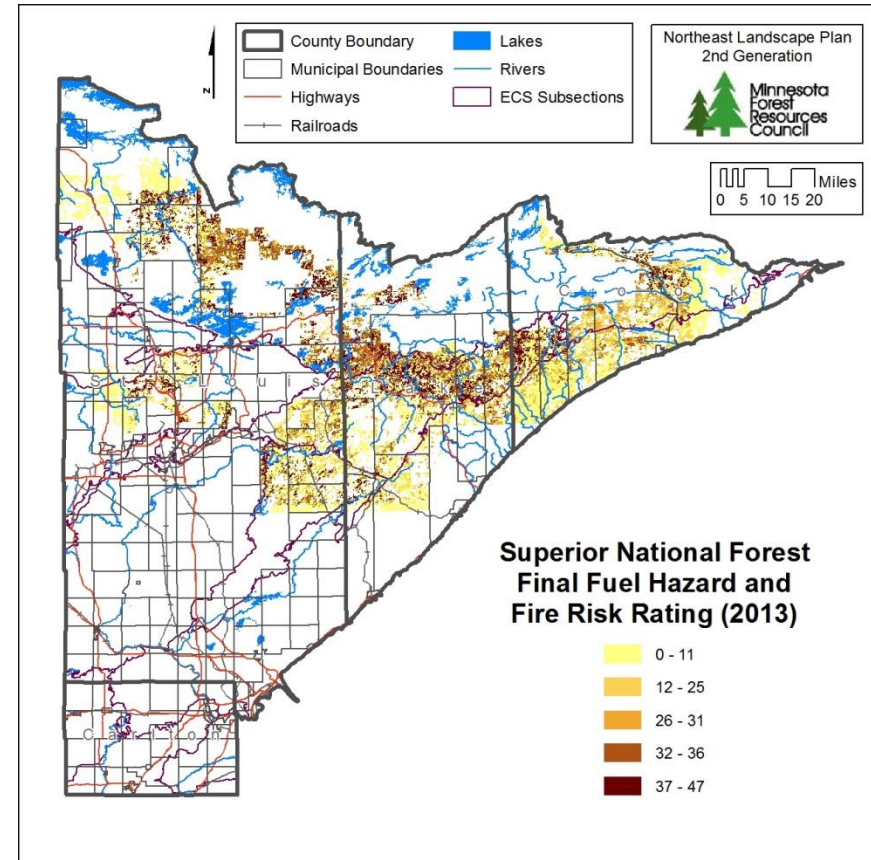
Wild-land Urban Interface – Fire Management

The Northeast Landscape has a long and widespread fire history with over fifty percent of the regional land cover identified as fire-dependent by the MN DNR Native Plant Community Classification System. The region lies within the boreal forest system where natural fire occurrence is common and has a variety of fuel types with well-established historical fire patterns. The utilization of this landscape for remote recreation activities and expanding wild-land development complicates wildfire management. Several major fires have occurred in the region since 2005 including the Pagami Creek, Ham Lake, Cavity Lake, and Alpine Lake fires which have burned a combined 200,000 acres. Climate change projections indicate fires in the region may become more frequent and more intense.

Expanding populations, with expanded housing needs, and increasing parcelization, place more structures in close proximity to forest lands. This increases threats due to wildfires, and makes fuel management through controlled or allowed burns more difficult.

As a result of the fire potential and frequency in this region, there are a number of organizations and systems in place which have experienced staff and equipment to identify and suppress wildfires. This includes the Minnesota Incident Command System (MNICS), which is an interagency group with state and federal partners that cooperate in management of wildfire and all risk incidents and provide standard procedures, practices and information to facilitate, coordinate and support actions on incidents in Minnesota. In addition, community wildfire protection programs such as Firewise focus on reducing fuel sources and making homes and communities more prepared for dealing with wildfires.

Wildfire fuel management is an integral part of land management in the region. Fire's role in maintaining the regional ecosystem has been greatly altered following European settlement. Large, intense fires spread across the region after a period of heavy logging in the late 1800's and early 1900's. This period was followed by a time of fire suppression. The combination of major fires and subsequent fire suppression had dramatic impacts on the forest type and ecology of the region. Through mechanical treatment and prescribed burning land managers are able to simulate this critical natural process and support ecosystem health. These efforts both simulate natural processes and reduce the overall risk of catastrophic fires in the region.

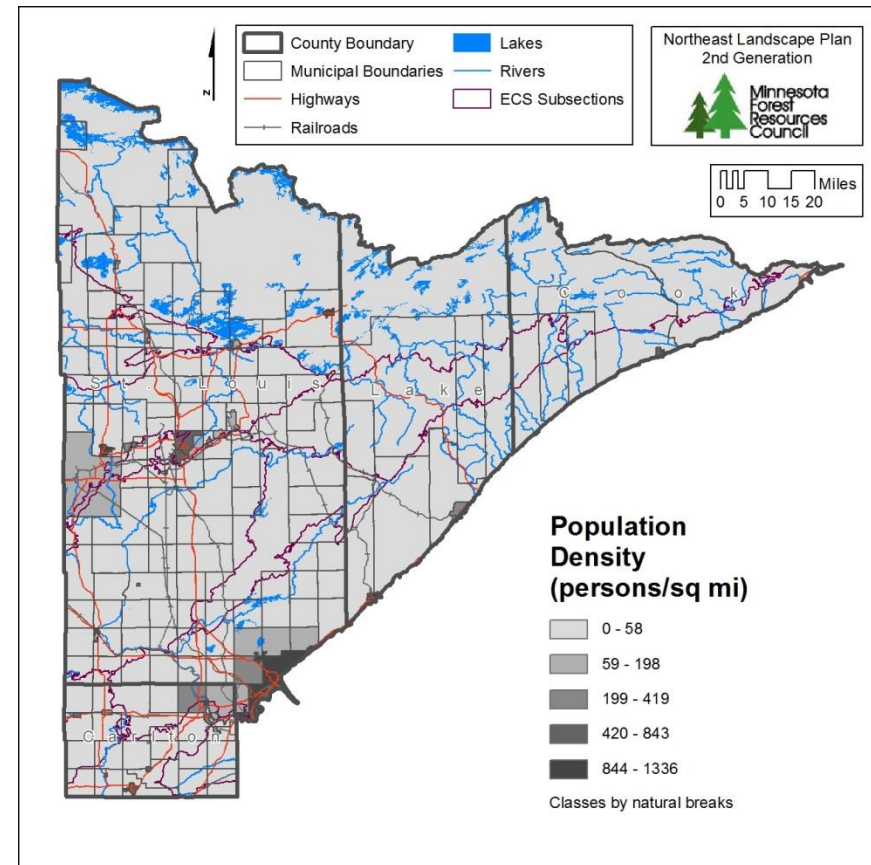


Population and Housing

Most of the region is relatively rural with population densities less than 10 people per square mile and an overall population density of 21.8 people per square mile. The highest population densities occur in the cities of Duluth, Virginia, Hibbing, Cloquet, and areas of rural development surrounding them. Densities of less than 10 people per square mile occur throughout Lake and Cook Counties except in the North Shore cities of Silver Bay, Beaver Bay, Two Harbors, and Grand Marais. Population densities in many portions of the region vary seasonally, with 45% of the homes in Cook County and 26% in Lake County utilized seasonally.

The region's forests and associated outdoor activities are a key factor bringing people to the region and keeping them here. This is complicated, however, by a lack of good paying stable jobs. The four-county region saw a population decline of 6.4% between 1970 and 2000. This was not consistent across the region with population falling in Lake and St. Louis Counties and rising in Carlton and Cook Counties. The region has experienced a small (1.3%) increase in total population between 2000 and 2010 and is expected to increase by 6.4% between 2010 and 2040. This is significantly below rates of increase projected for the state of Minnesota, but reverses the regional population decrease between 1970 and 2000. Regional population patterns may change significantly if new industries such as mining come into or expand in the region.

The Northeast Landscape is anticipated to have an aging population into the future. By the year 2040, the U.S. Census Bureau estimates the percent of the population in the 25 to 64 age group to drop from 52.3% to 46.9%, and the 65+ age group to increase by 60%. This is a result of an aging resident population and an influx of retirees moving into their vacation homes full-time leading to an aging but wealthy population in some regions of the Northeast Landscape.



Northeast Landscape			
Age Group	2010	2040	% Change
0-24	79,488	77,156	-2.9%
25-64	131,554	125,565	-4.6%
65+	40,612	64,994	60.0%
Total	251,654	267,715	6.4%
Source: Minnesota State Demographic Center			

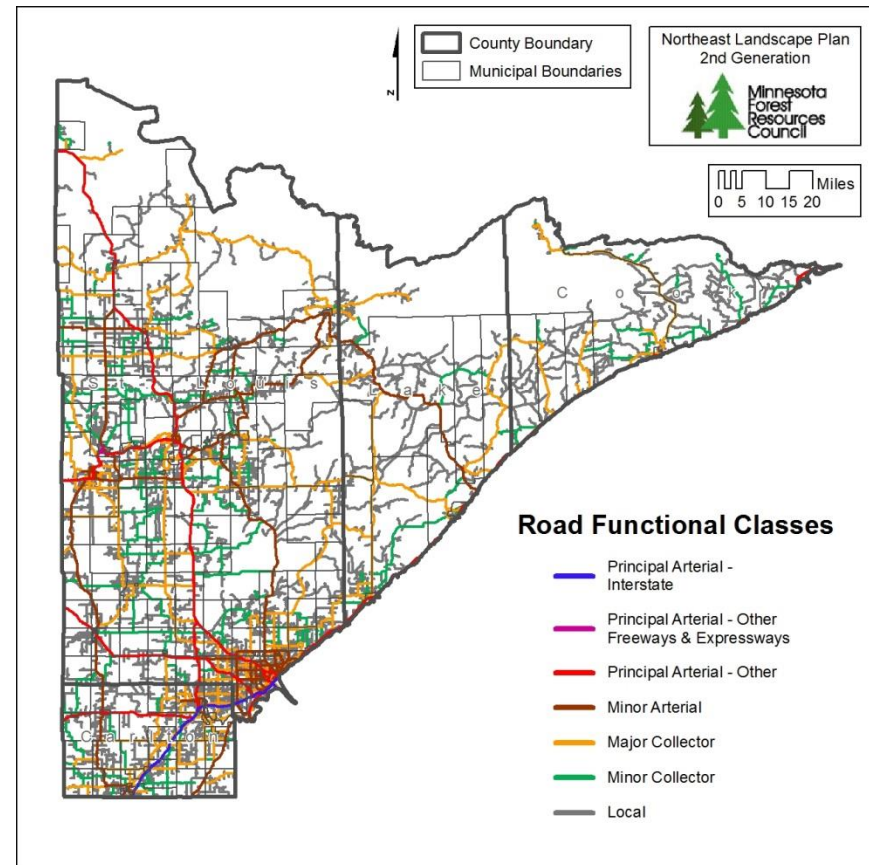
Transportation

The Northeast Landscape has a wide range of transportation options including shipping on the Great Lakes, a series of airports, a rail network, and a roadway network that includes Interstate 35, US Highways 2, 53, and 169 and state and county highways systems connecting the landscape locally, regionally, and globally.

There are over 9,000 miles of roads in the Northeast Landscape and approximately 86 percent of them are designated collector or local roadways. This network of roadways is important for accessing the region's resources including timber, recreation opportunities, minerals, and private properties, but many of these lower level roadways are subject to seasonal use restrictions which are implemented to protect the roads from damage. Increasingly early springs complicate winter access and transportation

Checkerboard ownership in the Northeast Landscape requires coordination to maintain forest roads and achieve sustainable access to multiple resources in the region.

The Twin Ports of Duluth, MN and Superior, WI create the largest freshwater port in the world and is frequently in the top 10 largest tonnage ports in the United States. These ports provide access to the interior of the continent and provide a global connection not available to the other forested landscapes in Minnesota.



Part 2. Strategic Policy Framework: Where do we want to go?

Section 5

Working Principles and Definitions



This section of the Plan outlines the principles the Northeast Landscape Planning Committee utilized to develop their vision for the future forests of the Northeast Landscape. This section also provides definitions of the terms used to organize the strategic policy framework outlined in Section 6.

A. Working Principles

Early in the planning process, the Planning Committee formulated a series of working principles to summarize how they viewed the context of the forests in the Northeast Landscape over time and how they generally recommend interested stakeholders pursue sustainable forest management in the future. The working principles were developed to provide an initial set of shared or agreed upon perspectives as they developed Part 2 of the Plan. This part of the Plan represents the heart of the Plan. Users of the Plan are encouraged to read through these principles to gain that shared perspective with the Planning Committee. The following narrative summarizes the Committee's working principles:

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Principle 1. Work Collaboratively to Manage the Landscape

Northeast Planning Committee encourages users of this document to commit to advancing the goals and objectives in this plan on their lands. We recognize and appreciate the voluntary approach to landscape and site-level forest management directions in Minnesota. Each entity has its own management plan to follow, yet at the same time we understand that we can achieve an improved balance among competing economic, social and ecological interests by working collaboratively to sustain forests.

Principle 2. Use the Best Available Science and Professional Judgment to Inform Decisions.

We recognize that forest ecosystems are incredibly complex and that science is an ongoing endeavor. Decision makers need to continuously stay current in relevant topics in order to arrive at the best possible answers. We also acknowledge that the past is an important but not the only guide to anticipating future conditions, and that we will need to commit to continuous improvement and adaptive management in order to successfully plan for a to a range of plausible futures. In our evolving management endeavors, we commit to using the best available science to inform decisions.

We recognize that natural resources have limits. Exceeding these limits can have short- and long-term ecological, economic and social consequences.

This update to the 2003 Northeast Landscape Plan incorporates important new knowledge to support adaptive management of the region's forest resources. Studies by the University of Minnesota Boreal Forest Resiliency Project (BFRP), the Northern Minnesota Climate Change Response Framework (NM CCRF), the University of Minnesota Duluth (UMD) Business School, and the Natural Resources Research Institute (NRRI) have strengthened our understanding of economic and ecological aspects of the Northeast Landscape. At the same time through the continued efforts by the MN Biological Survey, the Nongame Research Program, The Nature Conservancy, and others this plan reflects the best available information on native biodiversity, sensitive areas, and rare species. Through continued efforts by the USFS, TNC, DNR Ecological Classification System and Silviculture programs, the University of Minnesota, and others this plan incorporates very relevant emerging science bringing together forest plant ecology and silviculture in the region as well as learning more about resources that can be very productive with relatively limited ecological impacts. Science is helping us to better understand impacts as well as potentials for increased productivity balanced with ecological protection.

Principle 3. Practice Sustainable Forest Management to Achieve the Region's Ecologic, Economic, and Social Goals.

Major forest fires, declining budgets, conflicting management goals, rapidly changing global economy, and climate change are a few of the major challenges we face today in forest management. The Planning Committee encourages the use of the SFRA definition of 'Sustainability' for all planning decisions: *"Meeting the needs of the present without compromising the ability of future generations to meet their own needs."* The Planning Committee feels strongly that sustainable forest management practices have become essential to not only the integration of more advanced ecological concepts but also to improving economic and social conditions as well.

Principle 4. Develop Options Collaboratively

Forest management has evolved since extensive logging began more than a century ago. Through improved science and policy, forest resource managers have discovered the benefits of developing alternative ways to harvest and manage forests at a variety of scales. At the same time demands on our forests now include recreation, housing, energy, carbon sequestration and more. Multiple users and multiple benefits demand multiple options for managing forests.

The complexities facing resource managers require that we foster a collaborative work environment that encourages a hard look at all options through an all lands approach. Multi-faceted issues demand thoughtful consideration of a range of management options based on conditions, goals, and objectives across the region. We must accept that even under multiple use management, the primary use will have an impact on other options and no one area will be able to meet all needs. Options and alternatives generated and discussed collaboratively help us think more clearly and find more broadly supported solutions.

The landscape management process allows for the creation and evolution of options within an overall vision for forest management. The Northeast Planning Committee is committed to creating, shaping and refining a range of optional strategies to comprehensively guide the management of forests throughout the region.

Principle 5. Begin with an End in Mind

Successful landscape management involves collaborative actions by many partners in four phases including planning, coordination, implementation, and monitoring/evaluation. 'Beginning with an end in mind' means providing adequate time and efforts in planning and

coordination *before* implementation. Developing appropriate and realistic ends means monitoring past efforts and learning from them (i.e. adaptive management). These collaborative approaches will help us all be more effective in managing forests in the region in ways that balance economic, social, and ecological interests.

B. Overview: Planning Terminology

The Planning Committee adopted a series of nested terms to better organize the multitude of ideas and concepts suggested by the people involved in the planning process. The terms were standardized to aid in the development and implementation of the Plan and are defined as follows:

Asset. A benefit or strength that enables progress towards Desired Future Conditions.

Issue. A problem, challenge, or unresolved conflict that requires resolution to improve progress towards Desired Future Conditions.

Desired Future Condition. Desired Future Conditions (DFC) are broad overarching statements that describe preferred or desired conditions that a given geographic area or region will be like at the end of a given timeframe. DFC statements are very general and long range in nature. They are intended to provide an initial starting point for agreement on what forests in the landscape should be like in the future. This plan used a one hundred year horizon when describing the desired future conditions of forests.

Goal. Goal statements outline the general aims of an organization that it intends to attain at some point in the future. Goals are intended to provide general direction for a given resource initiative (ecologic resources, economic resources, or social resources). Words such as *encourage*, *protect*, *promote*, *preserve*, and *restore* are commonly found in goal statements. The goals in this landscape plan represent what the Planning Committee thought needed to be pursued over the next ten to twenty (10 – 20) years to promote sustainable forest resources across the region.

Objective. Statements that provide more specific direction on the efforts or strategies that are needed to implement each goal. Goals usually have more than one objective. Words like *construct*, *plant*, *remove*, and *monitor* are used to describe more specific direction in implementing the goals. Often, objectives will include quantifiable targets, as means to provide more specific and measurable parameters for monitoring progress towards the goals. The initial description of programs and projects are usually found in objective statements.

Strategy. Strategies are general approaches or methods to accomplish the vegetative management goals which ultimately move the landscape toward achieving the overall vision or desired future conditions. Strategies provide land managers with written descriptions of the general tools and techniques suggested to accomplish the goals and provide a basis for the further development of the appropriate tactical methods.

Users of this Plan are encouraged to briefly read the headings the various policy statements to gain a general sense of direction that the partners in the Northeast Landscape have chosen. Generally, the goals and objectives have been placed in a sequential or chronological order. In some instances, the statements may have been organized in order of diminishing control that the Northeast Landscape Coordination Committee and its partners have in implementation.

The strategic policy framework lays out an intended path for the management of forest resources in the region. It is meant to guide not only the efforts of the members of the Northeast Landscape Coordination Committee, but also landowners, resource managers, local officials, natural resources professionals and service providers working in the region. Only through the combined and coordinated efforts of these people will sustainable forest management be successful in the Northeast Landscape.

Section 6

Desired Future Conditions, Goals, and Objectives



This section of the Plan further describes the vision for the future forest conditions across the Northeast Landscape by providing the Desired Future Conditions and the approaches (Goals and Objectives) that the Coordination Committee and its partners can take to promote the management of healthy forests in the region. The SFRA requires the MFRC and its regional committees give equal consideration to the long-term economic, ecological, and social needs and limits of the state's forest resources. The Northeast Planning Committee addressed this legislative directive by organizing the strategic policy framework into seven Resource Topics (Note: These are not listed in order of importance):

- A. Forest Land Base,
- B. Vegetation and Terrestrial Wildlife,
- C. Water Resources and Aquatic Wildlife,
- D. Forest Products,
- E. Recreation,
- F. Minerals,
- G. Social and Cultural Uses and Values.

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Each of these Resource Topics includes relevant ecological, economic and social components to meet the requirements of the SFRA.

The Northeast Landscape Planning Committee identified Assets which benefit or support each resource, and Issues which describe problems or unresolved conflicts. Desired Future Conditions, Goals, and Objectives were then identified to sustain the assets and address the issues identified. In some cases, these Desired Future Conditions, Goals, and Objectives are very specific to the resource. However, there are also important opportunities to benefit multiple resources by considering Desired Future Conditions, Goals, and Objectives from multiple Resource Topics together. Managers should consider and weigh the desired future conditions, goals, and objectives identified in all of the Resource Topics when creating plans and projects. There is a broad array of perspectives, responsibilities, and interests regarding the management of forest resources. It is recognized that not every plan, project, or acre can contribute to every goal or objective. At the same time, collaboration to achieve common goals will benefit the forest resources of the Northeast Landscape.

A. Forest Land Base

Assets

- **Natural Resources.** The Northeast Landscape has an abundance of natural resources such as land, water, minerals, forests, fish and wildlife, etc. which are important economically, culturally, and socially to the residents and visitors of the region
- **Intact Forestland.** Nearly 85 percent of the region is forested.
- **Public Lands.** Over 70 percent of the region’s forestland is publicly owned and includes the BWCA Wilderness, Superior National Forest, Voyageurs National Park, 18 DNR Scientific and Natural Areas, 14 State Parks, and a diversity of other federal, state, county, and municipal forests.
- **Ecosystem Services.** Forestland provides a wide range of ecosystem services such as rainfall filtration, cool water temperatures, carbon sequestration, and nutrient cycling.

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Issues

- **Development and Parcelization.** Developed land estimates increased at a rate of 4,850 acres per year from 1992 to 2006, increasing the total developed land from 1.6 to 2.5% of the Northeast Landscape. Private holdings in the Northeast Landscape tend to be larger than in other forested regions of the state however conversion of larger ownership blocks to smaller ownership units including forest industry lands and family forest/NIPF lands is on the rise. These trends may result in a decrease in forest land, less access to forest land for the public, and escalate wildfire prevention and control costs. Parcelization of private holdings can also impact forest management, water quality, and fragments wildlife habitat.
- **Increasing Housing Demand.** The number of households is anticipated to increase by 6.25% from 2010 to 2020 and 19.18% from 2010 to 2040 in the Northeast Landscape. This may result in forest conversion to developed land use and increased demands on public services and infrastructure. This pressure may be further escalated by population increase resulting from mining expansion.
- **Property Tax Influences on Forest Fragmentation.** High tax costs associated with owning forest land can lead to parcel fragmentation.
- **Forest Industry Lands.** Forest industry has sold or is selling its land base to timber investment organizations (TIMOs) and real estate investment trusts (REITs). With these land sales there is the potential for conversion to other land uses or for land to be taken out of timber production and reduced hunting and recreation opportunities.

Desired Future Conditions

Forests are the major land cover across northeastern Minnesota, with development managed in ways that support sustainable forest management and no net loss of forestland in the region.

Goals and Objectives

Goal 1. Encourage the Retention of Forestland. Encourage the retention of forestland in community and natural resources planning and decision making processes.

Objective 1: Integrate Forest Resources Issues Into Regional and Local Land Use Planning. Advocate the integration of forest resources knowledge and information into land use planning and zoning processes in communities and counties throughout the region. Ensure forest resources interests are represented on county and city planning commissions and distribute information on forest resources to local governmental units in the region for their use in local land use planning.

Objective 2: Manage Development and Use in the Wildland-Urban Interface. Gather, organize, and distribute spatial data and related information about the wildland-urban interface in the region. Support the development and implementation of local, state, and federal government policies and programs that seek to minimize human-wildland conflicts across the region such as wildfire, emergency services, infrastructure, and human-wildlife interactions.

Objective 3: Restore Forestland. Advocate for the restoration of forestland and integrate the concept of restoring forest cover into resource management plans throughout the region.

B. Vegetation and Terrestrial Wildlife

Assets

- **Northern Forest Ecological Communities.** The large contiguous forests of this region provide habitat for numerous native plant, fish, game and non-game wildlife species.
- **High Quantity and Quality Timber Resources.** The Northeast Landscape is nearly 85% forested and contains a mix of forest types which are important to the wildlife, people, and economies of the region.
- **Forest Management Agencies.** This region has a wide range of federal, state, tribal, local, industrial, and non-profit organizations which are actively managing for a sustainable forest resource through timber sales, prescribed fires, and other management techniques.
- **Viable Forest Products Industry.** The region's forest products industry is critical to managing forests and associated wildlife habitat.
- **Wilderness.** The Boundary Waters Canoe Area Wilderness (BWCAW) lies within the Northeast Landscape providing large landscapes and remote habitat important to native flora and fauna including several rare species.
- **Rare and Unique Species.** Some of Minnesota's best known examples of endangered, threatened, and special concern species occur within the Northeast Landscape; many of these species occur nowhere else in the state.
- **Habitat Connectivity.** The overall habitat connectivity in the region's ecological communities is high compared to the rest of Minnesota.

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Issues

- **Forest Structure and Composition.** The structure and composition of today's forests present risks to maintaining some native plant and animal communities and make them vulnerable to a range of stressors including climate change, insects and diseases, and wildfire.
- **Patch Size.** Forest patches of all sizes are important; however, large patches are typically compromised under "normal" forest management practices and tend to be underrepresented on the landscape. Today's forest patches have become smaller and more uniform.
- **Forest Succession.** In upland fire dependent forests, short lived species (e.g. jack pine, aspen, birch) are reaching their life expectancy in many stands that lack the necessary tree species diversity to transition from mature to old forest in a way that resembles the natural history of the native plant community and provides adequate stocking for commercial forest management.

- **Natural Regeneration.** The natural regeneration potential for long-lived conifers has been limited due to a regional loss of mature seed trees and lack of seed bed disturbance through management.
- **Forest Health.**
 - o Mortality. Forest age has been increasing and mortality has exceeded harvest every year since 2006. Mortality is especially high for quaking aspen and paper birch. High rates of mortality create significant management problems (e.g. wildfire, insects and disease, climate change) and indicate that a substantial component of potential harvest is being lost. In addition, visual resources that affect visitation along the North Shore and other locations may also be impacted by high levels of tree mortality.
 - o Invasive Species and Diseases. Invasive plants, animals and insects are having increasing impacts on forest health in the region. Efforts to control or manage them, such as the gypsy moth quarantine, add additional costs to the forest products, recreation, and other industries in the area.
- **Size and Frequency of Wildfires.** Several major fires have occurred in the region since 2005 including: Pagami Creek, Ham Lake, Cavity Lake, and Alpine Lake. Climate change projections indicate fires may become more frequent and intense and produce landscape-scale changes to forests and result in detrimental impacts such as structure loss or changes in multiple resources such as timber, hunting and gathering opportunities, and wildlife habitat.
- **Game Management.** Regional moose populations have declined and moose have been identified as a species of concern by the State of Minnesota. White-tailed deer have also experienced recent density declines in much of the landscape but local high densities in certain locations (e.g. Lake Superior's North Shore) have negative impacts on forest regeneration and management.
- **Climate Change.** Projected climate change has management implications which include possible changes to the growing season, ecosystem composition and function, species composition, and forest productivity.
- **Future Forest Management.**
 - o Cost Effective Management. The lack of markets and declining demand for forest products will result in fewer forest management options across the region.
 - o Long Economic Return. The long-term nature of forest land investments (60 to 100 years to return) makes it difficult to support sustained ownership and management of private family forestlands.
 - o Declining Funding. Funding for forest management is decreasing. Investment in forest development activities not associated with a regeneration harvest such as pre-commercial thinning, planting, or forest type conversion have decreased as resources have declined.
 - o Declining Forest Management Capacity. Mill closures and economic swings may lead to increased challenges in forest management which could impact the ability of managers to meet management objectives for wildlife, forest composition, and age.

Desired Future Conditions

Forests are structurally, functionally, and compositionally diverse, exhibiting spatial patterns consistent with the region's ecology, to support communities of plant and animal species native to northeastern Minnesota.

Forests are managed to encourage species and communities that are adapted to the site conditions and are expected to improve resiliency to stressors such as wildfire, invasive species, diseases, herbivory, and climate change.

Forested ecosystems across the landscape are managed for site appropriate tree species, composition, and structure to increase stand quality, manage mortality risk, and attain productivity goals for a sustainable yield of natural resources.

Goals and Objectives

Goal 1. Promote Sustainable Forest Management. Maintain forests that support a full range of ecological functions. Use economic and social goals and objectives as a way to help achieve ecological goals.

Objective 1: Support the Development and Use of Sustainable Silvicultural Systems and Prescriptions. Utilize forest management methods that employ appropriate silvicultural systems and prescriptions that ensure the protection, restoration, and enhancement of ecological functions and achieve ecological, economic, and social goals.

Objective 2: Continue Forest Resources Education and Training. Support and cooperate with efforts by partner organizations to provide ongoing training to foresters, loggers, family forest landowners, and others involved in forest resources management.

Objective 3: Increase Application of Sustainable Forest Management Practices to Private Forestlands. Promote private land management practices and educational programs that maintain or enhance the services and functions derived from family forest land management throughout the region.

Objective 4: Maintain Wildfire Management, Prevention, Pre-suppression, and Suppression. Develop and support mechanical fuel management and prescribed fire projects to realize the ecological benefits of such activities. Use these methods to limit high severity wildfires and restore wild-land fire to the ecosystem where ecologically appropriate and human life, property, or resource values are not at risk.

Objective 5: Control Forest Pests and Invasive Species that Negatively Affect Forest Health and Ecology. Coordinate control efforts across jurisdictional boundaries to limit infestation, damage, and the spread and establishment of forest pests and invasive plant species that negatively affect forest health and ecology.

Objective 6: Consider Climate Change in Planning. Consider the projected impacts of climate change when developing planning and designing management efforts to increase the adaptive capacity of forests across the region. Include information on the role of sustainable forest management in carbon sequestration and storage.

Goal 2. Maintain, Restore, and Enhance Native Biodiversity, Including Wildlife Habitat and Populations. Promote forest management practices that ensure the protection, restoration, and enhancement of terrestrial habitats in the region. Forest management should provide ecological conditions needed to enhance or sustain viable populations of all existing native and desired non-native species.

Objective 1: Manage for a Mix of Forested Native Plant Community Growth Stages. Manage forested native plant communities in a range of growth stages to maintain, enhance, or restore native biodiversity. Ensure tree species are ecologically appropriate for the site and maintain the site's ability to adapt to a range of future conditions.

Objective 2: Manage for Structural Within-Stand and Between-Stand Diversity. Manage forested NPC stand vegetation conditions to promote a diversity of structural and spatial patterns necessary for the range of native species found in northeastern Minnesota.

Objective 3: Create, Manage, Maintain, or Increase Large Contiguous Forest Patches. Maintain or increase large contiguous forest patches which provide habitat for numerous native game and non-game wildlife species in the region. This should include large patches of young and old forests which support the species depending on each of these habitats.

Objective 4: Identify and Maintain Regionally and Globally Significant Areas. Collaborate with stakeholder groups to identify, maintain, restore, and enhance priority natural communities and significant areas in the region.

Objective 5: Identify and Maintain Endangered and Threatened Species and their Habitats. Collaborate with stakeholder groups to identify, protect, maintain, restore, and enhance habitats required by native species whose continued persistence in the region is in question.

C. Water Resources and Aquatic Wildlife

Assets

- **Water Resources.** The region has an extensive network of lakes, rivers, streams, and wetlands including over 150 miles of Lake Superior shoreline, more than 2,600 lakes covering 525,000 acres, and over 10,000 miles of streams and rivers. Most of the regions streams and rivers follow their natural course and a high number of the lakes have undeveloped forested shorelines. Several of the region’s water bodies support unique high quality wild rice resources.
- **Fisheries.** The region contains abundant coolwater and coldwater fisheries including 420 walleye lakes, 400 trout streams stretching for nearly 2,200 miles, and most of the native lake trout lakes in Minnesota.

Issues

- **Flooding and Channel Destabilization.** High intensity rainfall events, accelerated snow melt, and poor stormwater management can negatively impact regional water quality through increased floods, higher than usual peak flow, and stream erosion.
- **Fisheries.** Coldwater fisheries throughout the region are threatened by warming water temperature and changes in hydrology.
- **Invasive Species and Diseases.** Invasive plants, animals, and insects are having increasing impacts on aquatic resources in the region.

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Desired Future Conditions

Healthy forests and wetlands are recognized as key to protecting water quality and quantity across the landscape. Forests are managed in ways that maintain, enhance or restore soil quality, nutrient cycling, hydrologic functions, water quality, and riparian areas.

Goals and Objectives

Goal 1. Maintain and Enhance Water Resources. Maintain and enhance water resources in the region through sustainable forest management policies, programs, projects and practices.

Objective 1: Integrate Forest and Water Resources Management. Facilitate and support the integration of forest and water resources management to provide high quality water, sustainable hydrology, water quantity, and soil productivity necessary to support ecological functions at multiple hydrologic scales.

Objective 2. Develop Collaborative Efforts to Sustainably Manage the Hydrology of Watersheds in the Region. Coordinate the implementation of forest management strategies that support the sustainable management of water resources throughout the region with a specific focus on developing collaborative efforts in the Lake Superior North, Lake Superior South, and Nemadji watersheds.

Objective 3: Implement Site-Level Guidelines and other Relevant Best Management Practices to Protect Water Resources. Implement best management practices to maintain appropriate flow regimes and soil productivity, minimize erosion, soil compaction, soil displacement, and nutrient loss.

Objective 4: Support Aquatic Habitat Quality. Maintain or improve lake, stream, and riparian habitat quality and sustainable hydrology.

Objective 5: Consider Climate Change in Planning for and Management of Water Resources and Aquatic Wildlife. Consider climate change science in planning for and management of water resources and aquatic wildlife across the region.

D. Forest Products

Assets

- **Forest Products Industry and Infrastructure.** The region is home to two paper mills, an engineered wood plant, one of the largest sawmills in the state, and 102 logging companies. The region also supplies a significant amount of timber to mills located outside the Northeast Landscape boundary. The forest products industry in the region provided nearly \$900 million in economic output and 1,800 jobs in 2011.
- **Forestland Ownership.** The region has a great diversity of forestland ownership with lands managed by federal, state, county, tribal, industrial, non-industrial, and non-profit entities. This diversity buffers the forest products industry through changes any one sector's policies or practices.

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Issues

- **Aging Forest, Declining Health, and Timber Quality.** The most abundant timberland age class in 1977, 1990, and 2003 FIA surveys was 41 to 60 years but increased to 61 to 80 in the 2012 survey. There has also been an increase in 101+ year timberland from 1977 to 2012. These aging forests are more vulnerable to mortality, fire, and insect outbreaks and their associated timber is of decreasing value to the forest products industry. Utilizing this over-mature wood presents efficiency challenges to the local mills and creates management challenges associated with what to do with over-mature wood when markets do not exist.
- **Climate Change.** Climate change projections indicate significant impacts to some native plant communities and their associated timber species which could have major economic impacts on the region. Conversely a warmer-drier climate could benefit other commercially valuable species into the future.
- **Forest Industry.**
 - Mill Closures/Partial Shutdowns. Mills in Bemidji, Brainerd, Cook, Deerwood, Duluth, Grand Rapids, and Sartet closed or partially shut down between 2006 and 2013.
 - Recession and Globalization. The economic downturn beginning in 2008 impacted nearly all sectors. The rapidly changing global economy is increasingly challenging to forest based industries competing with overseas costs of production.
 - Declining Demand. Paper consumption has been on the decline since 2005/2006; however, pricing has held (mostly) as a result of reductions in capacity and increases in efficiency. There was a rapid decline in housing starts from 2006 to 2009. Housing starts have been slowly trending upward since 2010, but demand for wood construction materials has not returned to pre-recession levels.
 - Lack of New Markets. While the fiber product starting to be produced by Sappi offers one new direction, the Planning Committee has suggested a need to develop new viable markets for forest products from the region (e.g. bioenergy).

- Declining Timber Harvests. The volume of pulpwood harvested in the region declined by over 35 percent from 2005 to 2010 this will have impacts on timberland health and productivity.
- Net Importer. Even with the declining timber demand, Minnesota has been a net importer of pulpwood since 2000.
- Uncertainty in the Reliability and Predictability of Timber Supply. Uncertainties in timber supply coupled with changes in forest product demand make it difficult to confidently project future trends and therefore forest product companies' economic investment timeframes are shorter than they used to be.
- Loss of Logging Infrastructure. The average age of the logging work force is increasing and the large capital investments required for logging operations limit entry and retention in the business. This has led to inadequate logging infrastructure in some parts of the region.
- Transportation Distance. Distances of timber harvest sites to mills in Minnesota are greater than in other parts of the country and the world. Higher transportation costs negatively affect the forest products industry in the region and the state.
- Sustainable Employment. It is difficult for the forest products industry and the network of supporting employers to create and sustain jobs for workers across the region.

Desired Future Conditions

There is a robust and sustainable landscape that supports a full range of diversified and economically viable forest products providing economic opportunities which complement the current and future needs of the region's people, businesses, and communities.

Opportunities to use vegetation management to both provide forest products and achieve additional resource management objectives are realized.

Goals and Objectives

Goal 1: Enhance Forest Health and Productivity. Enhance forest health and productivity to ensure a sustainable supply and availability of forest resources suitable for the region.

Objective 1: Manage for a Mix of Site Appropriate and Marketable Forest Cover Types That Support Forest Based Economies. Support a diverse and robust forest-based economy by utilizing native plant community information to reflect potential tree composition and diversity across the range of anticipated future conditions. Manage for site appropriate and marketable tree species to increase stand quality, manage risk, and attain productivity goals.

Objective 2: Provide Quality Timber and Healthy Forests Within Reasonable Transportation Distance to Markets. Utilize the forest products industry to create and maintain healthy sustainable forests within reasonable transportation distance of the regional mills.

Objective 3: Control Forest Pests. Control infestation, damage, and spread of pests that affect forest health and productivity in a cost effective way. Support efforts by partners across the region to limit the establishment and spread of forest pests through early detection, treatment, and ongoing forest management.

Objective 4: Limit Wildfire Damage. Develop and support fuel load management projects to limit unwanted high severity wildfires. Periodically inventory and assess key areas in the region where these projects should be implemented.

Objective 5: Reduce Forest Mortality. Recognize the cycles and time horizons of natural outbreaks or disturbances and look for opportunities to reduce forest mortality and capture economic value prior to mortality across the Landscape including collaboration on cross boundary projects.

Objective 6. Look for Opportunities to Provide Forest Products While Achieving Multiple Resource Objectives. Use active management as a tool to achieve goals and objectives for the following Resource Topics: Vegetation and Terrestrial Wildlife, Forest Products, Recreation, Water Resources and Aquatic Wildlife, and Social and Cultural Values.

Goal 2: Retain, Expand, and Diversify the Regional and Local Forest-based Economies. Encourage the retention, expansion, and diversification of regional and local forest-based economies by fostering increased collaboration and cooperation.

Objective 1: Develop and Implement a Forest Industry Retention/Expansion Plan. Develop and implement a retention/expansion plan that addresses the issues the forest products industry is facing. Work with economists, business, ecologists, natural resource managers, and social scientists on this initiative.

Objective 2: Support Local Wood Markets and Developing Forest Product Technologies. Support the development of new specialty forest products, biomass power generation, chemical cellulose, and other developing technologies. Support the development of financially viable small scale biomass projects and integrate these projects with locally based fuel load reduction efforts. Coordinate these efforts with local economic development commissions to support the retention and development of local wood product markets.

Objective 3: Increase Certified Lands. Improve and streamline forest certification to increase the national and global merchantability of forest products from the region and the state.

Objective 4: Improve and Maintain the Permanent System-level Road Network. Work with partners to ensure long-term collaborative planning, development, and maintenance of the region's permanent system-level road network.

Objective 5: Increase Opportunities for Sustainable Summer Timber Harvesting. Support programs and projects that improve and maintain public infrastructure that would allow access to areas that can be safely and sustainably harvested in non-frozen-ground conditions.

E. Recreation

Assets

- **Outdoor Recreation.** Travelers come to experience the woods and waters of Northeast Minnesota which provide opportunities for hiking, biking, canoeing, kayaking, boating, camping, fishing, hunting, bird and wildlife watching, alpine and Nordic skiing, snowboarding, snowshoeing, snowmobiling, off-road vehicle riding, berry and other non-timber product harvesting, and many more activities amid unique and beautiful scenery.
- **Outdoor Recreation Attractions.** The region contains several world class outdoor recreation attractions, including the BWCA Wilderness, Superior National Forest, Voyageurs National Park, fourteen State Parks, and fifteen State Forests. The BWCAW is the most visited wilderness area in the country and is often cited as one of the top outdoor recreation destinations in the United States.
- **Water Access.** The region features over 480 public water access sites for visitors to experience the 2,600 lakes covering nearly 525,000 acres, 10,000 miles of streams and rivers, and more than 150 miles of Lake Superior shoreline.
- **Trails.** The region contains many trail opportunities to enjoy ATV riding, snowmobiling, hiking, skiing, biking, and mountain biking trails. This includes five State-Designated Trails, six State-Designated Water Trails, and the nationally renowned 296-mile Superior Hiking Trail.
- **Tourism.** Tourism and recreation are key players in the Northeast Landscape, generating over \$825 million in economic output and nearly 15,000 full-time equivalent jobs in 2011. This is particularly important in certain portions of the region with 30% of Cook County's workforce employed in the accommodation and food services sector.
- **High Amenity Properties.** The region contains over 8,000 rental units at the numerous resorts, hotels, and outfitters. This includes about 25% of all resorts in Minnesota.
- **Scenic Byways.** This region is known for beautiful drives and is a frequent destination for fall colors excursions. It also features 290 miles of scenic byways between the North Shore Scenic Drive, the Gunflint Trail, Superior National Forest Highway 11, Skyline Drive, and the Veterans Evergreen Memorial Byway.
- **Outdoor Recreation Communities.** This region has several communities which serve as access points for residents and visitors to experience high quality outdoor recreation opportunities.

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Issues

- **Competition Among Multiple Uses Affecting the Recreation Industry.** There is a challenge to manage the multiple uses in the region to maximize gains from and minimize the detrimental effects of various resource uses on recreation. For example, this may occur from conflicts between demand for motorized and non-motorized recreation, or varying effects of mining-related activity.

- **Vacation Travel Distance.** With increases in fuel costs and other factors there has been a decreasing trend in vacation distance traveled.
- **Capacity and Sustainability of Resorts.** Minnesota has seen a net loss of 491 resorts from 1985 to 2010; the decline has not been as dramatic in the Northeast Landscape, with a net loss of only nine resorts during that time but potential changes in the quantity and quality of recreation opportunities in the region may lead to regional resort declines.
- **Economic Cycles and Swings.** Cyclical economies create significant and ongoing challenges for economic development in the region. This is especially important in terms of gas prices and spendable income, as much of the Northeast landscape is located far from metropolitan population centers.
- **Recreational Interests.** Some metrics indicate a general decrease in outdoor activity participation such as hunting, fishing, camping, and hiking.
- **Seasonal Economy.** The seasonal economies of tourism lead to peaks and valleys in employment needs and opportunities which create significant challenges for employers and employees alike.
- **Aging Forest.** Older forests may positively or negatively impact visual quality and recreational experiences. Aging forests can result in larger trees and more park-like stands that are favored by many recreationists. They can also result in more dead and dying birch and aspen which impact viewshed, but may also provide habitat for bird species and therefore wildlife viewing opportunities.
- **Ability to Manage/Maintain Existing Facilities.** While there are ample recreation facilities within the Northeast Landscape, declining budgets and increasing maintenance costs can result in facilities in less than optimum condition. The ability to find new funding sources and to enlist volunteers for facility maintenance will be crucial to maintaining a quality recreation experience for visitors.

Desired Future Conditions

The role and contribution of forests to the region's economic and social well-being is acknowledged and the recreational settings, infrastructure, access, and associated tourist industry are sustainably developed and maintained to make them ecologically and economically viable.

A spectrum of quality motorized and non-motorized recreational opportunities exist throughout the Northeast Landscape, and are available to satisfy a diversity of recreational interests, skills, and abilities.

To the extent possible and where appropriate, the recreational user will have a seamless experience regardless of the ownership or location of the recreational facility being used.

Forests are an essential landscape feature and the region's natural resources based communities are supported by the sustainable management and utilization of these natural resources to create a place for high quality recreation experiences and living opportunities.

The land and water present an overall attractive, naturally appearing landscape, with a variety of vegetation types, ages, and openings (permanent and temporary).

Forests maintain cultural, historic, and heritage resources and support sustainable populations of fish and wildlife species for hunting, fishing, and wildlife watching opportunities.

Recreational facilities are located to enhance visitor enjoyment of unique landscapes and scenic views, while minimizing adverse environmental impacts.

Visitors are knowledgeable of available recreation opportunities and actual experiences meet or exceed pre-visit expectations.

Goals and Objectives

Goal 1. Promote High Quality Forest-based Experiences for People Recreating in the Region. Promote high quality forest-based experiences by focusing on supporting and protecting significant regional assets including cultural values, recreation opportunities, historical landscape features, natural resources, and aesthetic qualities of the forest that contribute to northeastern Minnesota's social and economic vitality.

Objective 1: Ensure Sustainable Access and Use of Public Lands and Waters. Support programs and projects that ensure sustainable access of public lands and waters in the region for multiple motor and non-motorized uses.

Objective 2: Enhance Fish and Wildlife-Related Recreation. Support projects that enhance existing native and desired non-native forest-based fish and wildlife populations which address current and future interests and needs.

Objective 3: Maintain Visual Quality and Scenic Corridors. Implement MFRC Best Management Guidelines for Visual Quality to ensure forest management activities to do not negatively impact the visual quality of the region, especially along those travel routes that have high visual sensitivity. Support the development and implementation of projects such as the scenic byway program that promote and maintain the scenic qualities of the region.

Goal 2: Enhanced Visitor Experience and Increased Visitor Knowledge of Outdoor Recreation Opportunities. Public and private recreation providers work together to enhance visitor experience and increase visitor knowledge of the wide range of available opportunities.

Objective 1: Increase Awareness of Outdoor Recreation Opportunities. Support the development and distribution of information on regional outdoor recreation opportunities and the benefits of sustainably managed natural resources on recreation. Explore ways to increase the public's awareness of forest-based recreation opportunities.

Objective 2: Expand and Develop Forest-based Recreation. Support recreational planning efforts and implementation projects being developed by federal, state, and local entities.

F. Minerals

Assets

- **Minerals.** The Northeast region is home to one of the largest deposits of iron ore in the world and contains several other key minerals such as copper and nickel. Minnesota is the largest producer of iron ore and taconite in the United States.
- **Economic Outputs.** Taconite mining employees approximately 4,000 people in the region, and potential copper/nickel mines could employ thousands more.

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Issues

- **Mining.** Regional population and land use patterns may change significantly with mine expansion. Under maximum proposed expansion scenarios total mining employment could add 5,600 jobs to the region. This influx of residents could lead to additional pressures on the region's forests through increased housing and infrastructure development and additional burden on fire suppression efforts systems. Many residents may also shift from current positions to employment opportunities in the mining industry which could add pressure to existing industries.
- **Social and Environmental Effects.** There is concern about potential effects from minerals exploration and mining on water quality, wildlife, recreation opportunities, and other resources due to road construction, noise and traffic, acid rock drainage, remediation, and other issues.

Desired Future Conditions

Minerals exploration and mining development is done in a manner which supports the region's vibrant natural resource-based economy while ensuring forest resources are maintained.

Goals and Objectives

Goal 1. Forest Resources Issues are Considered in Minerals Exploration, Mining Development, and Associated Land Use Planning. The potential positive and negative impacts of minerals exploration and mining development on the region's forest resources are considered during the permitting and planning process.

Objective 1: Participate in Responsible Mining Development Planning. Participate in the planning and permitting of mining operations in the region. Provide relevant information about forest resources to mining interests and permitting agencies so that forest resources are protected and maintained.

Objective 2: Integrate Minerals Exploration and Mining Development Considerations into Land Use Planning. Develop land use plans that consider and integrate projected minerals exploration and mining development activities.

G. Social and Cultural Values

Assets

- **Communities.** The communities and the people who live in them represent a great asset to the region.
- **Regional Economic Development.** Regional economic development authorities work in partnership with the state and federal governments and private sector to support economic development in the region.
- **State Conservation Funding.** There are several state conservation funding opportunities in Minnesota including the Legislative-Citizen Commission on Minnesota Resources (LCCMR) and the Clean Water, Land, and Legacy Amendment.
- **Native American Tradition.** The Bois Forte, Grand Portage, and Fond du Lac Bands of Chippewa (Ojibwe) have a long tradition of cultural uses of the forests and forest-dependent fish and wildlife species in this region.
- **Treaty Rights.** The three Chippewa Bands in the region maintain off-reservation hunting, fishing, and gathering rights in the 1854 Ceded Territory which plays a significant role in regional natural resources management.
- **Non-timber Forest Products.** Activities such as hunting, fishing, wild rice harvesting, black ash basket making, paper birch bark crafting, and maple sugar collecting continue in the region and have strong cultural significance. Balsam fir boughs, maple syrup, wild berries, mushrooms, and other non-timber forest products are important to the regional culture and economy for tourists and residents alike.
- **Fire Control.** The Minnesota Incident Command System (MNICS) is an interagency group of state and federal partners that cooperate in wildfire management to ensure the region has experienced staff and equipment to identify and suppress wildfires.
- **Educational Institutions and Research with Strong Natural Resources Programs.** Cloquet Forestry Center, Natural Resources Research Institute, University of Minnesota Duluth, Fond du Lac Community College, and Lake Vermillion Community College. Other organizations providing environmental or forest-related educational programs include Wolf Ridge Environmental Learning Center, North House Folk School, and Sugarloaf Cove.
- **A General Public with a Strong Interest in Environmental Issues and Forest Health.** Many residents live in or near forest environments, and have a strong connection to natural systems. Many are directly involved, or know people who are involved, in the forest industry, so they understand its importance.
- **Collaborative Projects.** Partners across the region have implemented sustainable forest management projects that support forest-based economic opportunities.
- **Transportation.** Infrastructure includes Great Lakes shipping, several airports, and an extensive railroad and roadway network including Interstate 35, US Highways 2, 53, and 169 in addition to state and county highways systems.

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Issues

- **Aging Population.** The 65+ age group is anticipated to increase by 60 percent from 2010 to 2040 and this baby boomer retirement is expected to have big costs and benefits for society with many of them making their seasonal homes in the region their full-time retirement residences. This change may impact demands for forest resources, infrastructure, and public services.
- **Aging Workforce.** The number of workers in the 16-24 and 25-44 year age classes are anticipated to decline by 17.3% and 6.4%, respectively, between 2000 and 2035 while the 65 plus employment is anticipated to increase by 140.6% in the Northeast Landscape this demographic may lead to changes in the regional tax base, diversity of services, and number of school children.
- **Seasonal Employment.** Natural resource-based industries including forestry, tourism, and the service industry are major employers in the region; however, some of these provide only short-term, low paying jobs. In some communities, these jobs are being filled by foreign workers, suggesting the resident workforce is too small to support the tourist economy.
- **State Conservation Funding.** Not enough of the 2008 Clean Water, Land, and Legacy Amendment money is being spent in this region of the state.
- **Climate Change.** Climate change may significantly affect the seasonal temperature, precipitation, wildfire frequency and size, forest species mix, and have many other impacts that will change how people interact with the natural resources of this region.
- **Transportation and Access for Multiple Resources.** Many forest roads and trails may only be used during the frozen season, and some roads have seasonal weight restrictions. This limits access for multiple resources including timber, minerals, and recreation. There is also a challenge to maintain forest roads needed for access in a time of declining budgets.

Desired Future Conditions

Forests within the region are viewed by citizens as an integral contributor to the quality of life enjoyed by current as well as future generations and maintain this as a place for high quality recreation experiences and living opportunities.

Forests are an essential landscape feature and the region's natural resources based communities are supported by their sustainable management and utilization.

Forests continue to maintain cultural, historic, and heritage resources and support sustainable populations of fish and wildlife species for hunting, fishing, and wildlife watching opportunities.

People have a greater awareness of the importance of forests from ecological, economic, and social perspectives and actively engage in their stewardship.

Forest resources are managed in a coordinated and collaborative manner across all lands throughout the region.

An increased proportion of Clean Water, Land, and Legacy Amendment, Legislative-Citizen Commission on Minnesota Resources, and other sources of public funding are secured for regional forest management projects and practices including the support and education of family forest owners on available forest management opportunities.

Goals and Objectives

Goal 1. Promote High Quality Forest-based Experiences for People Living, Working, and Visiting the Region. Promote high quality forest-based experiences by focusing on supporting and protecting significant regional assets including cultural values, recreation opportunities, historical landscape features, natural resources, and aesthetic qualities of the forest that contribute to northeastern Minnesota’s social and economic vitality.

Objective 1: Maintain Cultural Resources. Preserve cultural resources by working with partners in the region including tribal treaty rights and interests, community organizations, and similar interest groups to develop forest management projects that help sustain their ways of life and cultural traditions. Maintain cultural heritage resources in the region where forest management occurs.

Objective 2: Promote Connections Between Forest Resources and Local Communities. Support the development and implementation of projects that seek to strengthen the interconnections between public lands, natural resources, and local communities.

Objective 3: Support Community Forestry. Support the development and implementation of community forestry projects that promote a variety of public and private benefits.

Goal 2. Encourage Sustainable Land Use. Encourage the integration of sustainable forest resources management concepts including wildfire management into community planning and decision making processes.

Objective 1: Support Coordinated and Collaborative Planning. Advocate coordination and integration of planning efforts between public and private landowners and land management agencies.

Objective 2: Implement Community Wildfire Protection Planning. Support the development and implementation of community wildfire protection plans by local governmental units in the region. Integrate concepts from the National Fire Cohesive Strategy, Firewise programs, and climate change projections into policies and projects.

Objective 3: Ensure Sustainable Access and Efficient Transportation. Support programs and projects that ensure sustainable access and transportation for multiple forest resources.

Objective 4: Support Private Forest Land Ownership and Management. Support outreach programing, stewardship planning, and project implementation that increase satisfaction and benefits family forestland owners perceive from owning and managing private woodlands. These include recreational use, providing wildlife habitat, timber sales, etc.

Objective 5: Consider Climate Change in Land Use Planning. Integrate climate change projections into land use planning efforts across the region.

Goal 3. Strengthen Public Awareness. Increase awareness about the importance and benefits of sustainably managed natural resources in the region.

Objective 1: Expand Natural Resources Outreach Programs. Support the development and distribution of information about sustainable natural resources policies, programs, projects, and practices for people living, working, and recreating in the region.

Objective 2: Increase Outreach through both Traditional and New Partnerships. Increase outreach and awareness about sustainable forest management by participating in the development of projects by partners in the region. Link and combine public outreach and education efforts on these projects in ways that support the implementation of the Northeast Landscape Plan.

Section 7

Vegetation Management Framework



The 2003 Northeast Landscape Plan laid out a series of long term goals for five upland Ecological Plant Communities in the Northeast Landscape. These goals were established on a 100 year timeframe and a major responsibility of the Second Generation Northeast Landscape Planning Committee was to maintain the general direction of these original goals while integrating new sources of information and understanding of Northeastern Minnesota's forested plant communities. Through this revision process the Planning Committee revised the original 100 year goals to provide specific forest vegetation management goals and strategies based on the NPC Classification System. These goals and strategies are based on the upland and lowland forest systems delineated in the NPC study and replace the Range of Natural Variability (RNV) goals established in the 2003 Northeast Landscape Plan. The table below summarizes the vegetation communities that structured the 2003 and 2014 vegetation management frameworks.

2003 Plan – Ecological Plant Communities	Native Plant Community Classification System	2014 Plan
Upland Forests		
Mesic White-Red Pine	FDn43: Northern Mesic Mixed Forest – FDn43a: White Pine - Red Pine Forest	FDn43: Northern Mesic Mixed Forest
Mesic Aspen-Birch	FDn43: Northern Mesic Mixed Forest – FDn43b: Aspen - Birch Forest	
	MHn44: Northern Wet-Mesic Boreal Hardwood-Conifer Forest	MHn44: Northern Wet-Mesic Boreal Hardwood-Conifer Forest
Dry-Mesic White-Red Pine	FDn33: Northern Dry-Mesic Mixed Woodland	FDn33: Northern Dry-Mesic Mixed Woodland
Jack Pine-Black Spruce	FDn32: Northern Poor Dry-Mesic Mixed Woodland	FDn32: Northern Poor Dry-Mesic Mixed Woodland
Northern Hardwoods	MHn35: Northern Mesic Hardwoods	MHn35: Northern Mesic Hardwoods and MHn45: Northern Mesic Hardwoods (Cedar)
	MHn45: Northern Mesic Hardwoods (Cedar)	
	MHn47: Northern Rich Mesic Hardwood Forest	
Lowland Forests		
--	AP: Acid Peatland	AP: Acid Peatland
--	FP: Forested Rich Peatland	FP: Forested Rich Peatland
--	WF: Wet Forest	WF: Wet Forest

This section provides a more detailed series of goals and strategies for land managers implementing this plan. These goals and strategies are based on the MN DNR's NPC Classification Framework at the system and class levels. NPC Systems were used when they provided an adequate level of specificity to guide landscape-level management whereas the NPC class-level was used to provide more specificity in some of the larger ecological communities (those estimated at greater than 100,000 acres in the Northeast Landscape). More information on the NPC Classification Systems is available in Appendix D.

Land managers and owners are encouraged to adopt and implement these more specific goals and strategies while acknowledging the voluntary nature of this and all components of the Northeast Landscape Plan. Partners are encouraged to view ECS and NPC as tools to provide relevant information to the decision making process, these concepts are not an end or a goal in and of themselves. The Committee further encourages that landowners use these concepts as ways to mimic natural systems and forests habitats in order to promote the sustainable management of forests across the Northeast Landscape.

This NPC based vegetation management vision updates and replaces the range of natural variation (RNV) framework established in the 2003 Northeast Landscape Plan. The science of forest resources management has evolved since the late 1990s and the Northeast Planning Committee sought to utilize this new information while maintaining the course established in the original plan. To support implementation and monitoring it will be important for organizations to communicate management activities between the NPC system and other ecological classification systems.

A. Supporting Information and Interpretation.

Each Goal and Strategy section is supported by information developed by the Minnesota DNR and the Natural Resources Research Institute:

- Field Guide to the Native Plant Communities of Minnesota (MN DNR)
- Tree Suitability Table (MN DNR Division of Forestry, Ecological Land Classification Program)
- NPC Silviculture Interpretations (MN DNR Division of Forestry, Ecological Land Classification Program)
- NPC Geospatial Modeling (Natural Resources Research Institute – University of Minnesota Duluth)

These resources were vital in the adaptation of the 2003 Goals and Strategies and the development of the 2014 Vegetation Management framework. The following text provides information on interpreting the information displayed in this section of the plan; however, users of this plan are strongly encouraged to review the original documents and utilize the wealth of information within them.

Tree Suitability Tables (Left Side of NPC-Class Tables)

Each native plant community summary includes a portion of the Minnesota DNR Tree Suitability Table – Version 2.2, 2013 (<http://files.dnr.state.mn.us/forestry/ecssilviculture/treetables2.pdf>). These tables were developed by the Minnesota Department of Natural Resources, Division of Forestry, Ecological Land Classification Program. Please use the following information to interpret these tables:

- Numbers: rank in order of competitive ability; 1=most suited; -- indicates trace presence; blank cells are for species not include in the Suitability Table.
- Color: Ability to compete with all vascular plants within NPC class (**GREEN** = excellent, **BLUE** = good, **YELLOW** = fair, **TAN** = poor, **WHITE** = not suitable)

– Letters:

w = tree species with a warmer synecological score than the community mean.

d = tree species with a drier synecological score than the community mean.

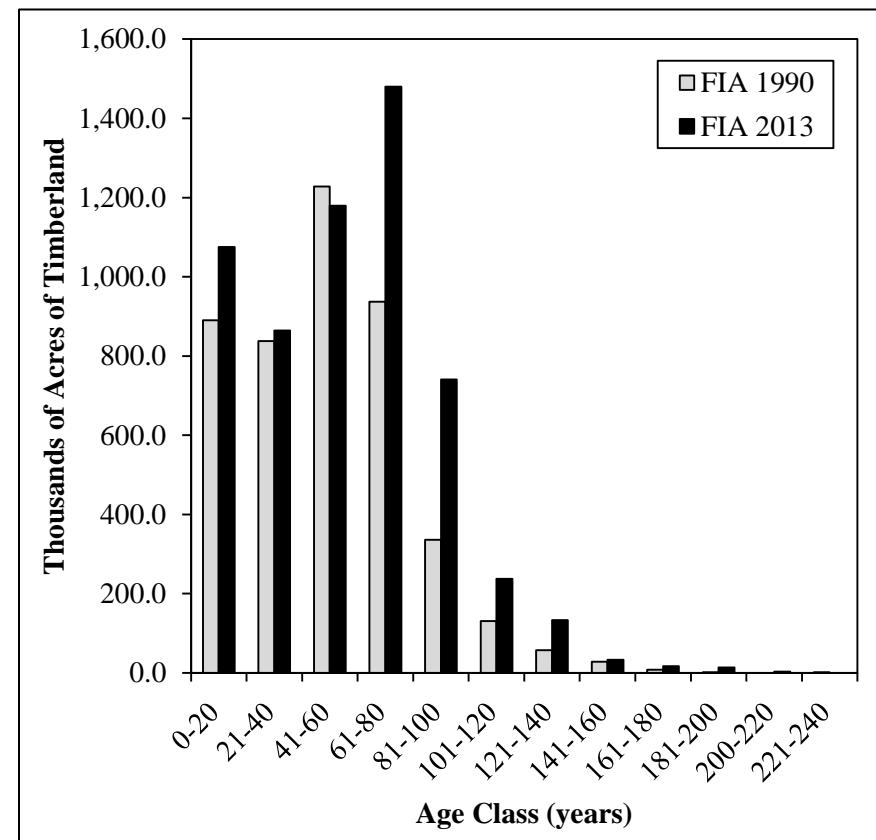
Public Land Survey vs Forest Inventory and Analysis Growth-stage Tables (Right Side of NPC-Class Tables)

The MN DNR Division of Forestry, Ecological Land Classification Program has developed Silviculture Interpretations for a number of NPC Classes (www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html). In the development of these Silviculture Interpretations the MN DNR created tables comparing Public Land Survey (PLS; *ca.* 1846-1908 AD) and Forest Inventory and Analysis (FIA; *ca.* 1990 AD) growth-stage data. The 1990 FIA data is the most modern dataset that has been analyzed in this manner due to changes in how FIA collects its data. Changes have occurred in the region's forests between the FIA 1990 data and the development of this plan including a general shift to more mature age classes (see figure below). Please acknowledge these potential shortcomings when interpreting the following tables and realize these are the best estimates the Planning Committee had to work with when amending the 2003 Northeast Landscape goals and strategies.

Please use the following information to interpret these tables:

- Table values are relative abundance (%) of trees at PLS corners (orange shading) and FIA subplots (blue shading) modeled to represent the NPC community and estimated to fall within the young, mature, and old growth-stages.
- Arrows indicate increase or decrease between growth-stages for common tree species.
- The bottom row allows for a comparison of the percent balance of growth-stages across the 'pre-settlement landscape' and the 'modern landscape.'

Note: This information is meant to give a rough idea of the change in species and growth stage over time and should be used to establish general boundaries and not interpreted as directions that should or even could be achieved.



Fire-Dependent Forest/Woodland NPC System (FD)

Description: Upland sites with dry to mesic soils which were strongly influenced by wildfires. Fires were the major source of species mortality and exerted strong influence on patterns of plant reproduction by exposing mineral soil seedbeds, triggering dispersal of propagules, and increasing the amount of light reaching the ground or understory. Fires periodically removed much of the litter, duff, and other organic material from the community and had a significant effect on nutrient cycling and nutrient availability. More information on this NPC System and associated NPC Classes including principal tree species can be found in Appendix D, the Minnesota DNR ‘Field Guide to the Native Plant Communities of Minnesota’, or at: www.dnr.state.mn.us/npc/classification.html

Area:

- 3,756,000 acres
- 51 % of Northeast Landscape
- 82 % of the upland area in the Northeast Landscape

Disturbance Regime History:

- High to very high rates of fire disturbances historically with return interval from 40 years to 100 years.
- The frequency and intensity of fires in fire dependent communities show a strong geographic pattern correlating to the local climate.

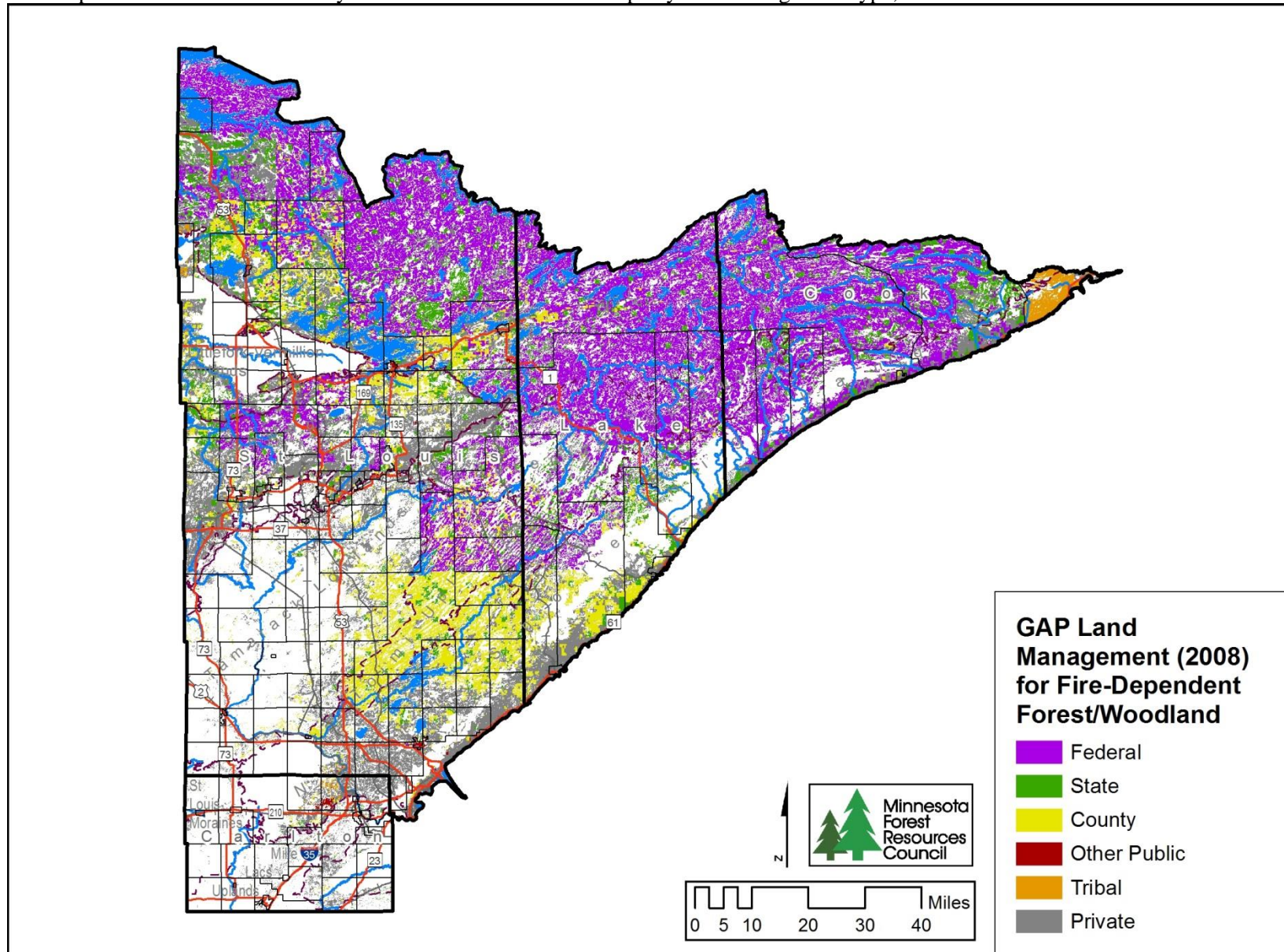


Land Management Category:

NPC Classes		Federal	State	County	Other Public	Tribal	Private	Total
FDn32	Northern Poor Dry-Mesic Mixed Woodland	837,000	108,000	34,000	2,000	< 500	126,000	1,107,000
FDn33	Northern Dry-Mesic Mixed Woodland	4,000	6,000	23,000	1,000	< 500	84,000	118,000
FDn43	Northern Mesic Mixed Forest	782,000	321,000	428,000	8,000	42,000	939,000	2,520,000
FD---	Other Fire Dependent Classes	< 500	< 500	1,000	< 500	< 500	10,000	12,000
	Total	1,623,000	436,000	486,000	10,000	42,000	1,160,000	3,756,000

Source: Natural Resources Research Institute – University of Minnesota Duluth; report available at www.frc.state.mn.us

Fire-Dependent Forest/Woodland System in the Northeast Landscape by land management type; 2008.



FDn32: Northern Poor Dry-Mesic Mixed Woodland

Description: Dry-mesic pine or black spruce woodlands, often mixed with paper birch and quaking aspen. Most common on relatively nutrient-poor, shallow, loamy soils over bedrock, but also present on sandy lacustrine plains. Crown and surface fires were common historically.

Area:

- 1,107,000 acres
- 15% of the Northeast Landscape

Tree Suitability	Tree Species	Young (0-35)		Transition (35-55)		Mature (55-95)	
		PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²
1d	Jack Pine	40%	1%	↓↓	↓	10%	0%
2	Black Spruce	1%	1%	↑↑	↑	31%	10%
3d	Red Pine	3%	--	↑		5%	--
4wd	Quaking Aspen	24%	74%	↓↓	↑↑	7%	43%
5wd	White Pine	5%	--	↑	↑	10%	2%
6wd	Paper Birch	19%	8%	↓	↑	17%	16%
7	Balsam Fir	6%	15%	↑	↑	13%	27%
-	Miscellaneous	2%	1%			7%	2%
-	White Spruce						
-	Red Maple						

Adapted from work done by MN DNR, Division of Forestry, Ecological Land Classification Program.
For Table Interpretation: See p. 7-2 and 7-3
¹ 6,156 Public Land Survey records for section and quarter-section corners (ca. 1846-1908 AD).
² 1,708 FIA (1990 AD) subplots that were modeled to be FDn32 sites.

Percent of NPC Class in Growth Stage	57%	56%	25%	39%	18%	5%
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Land Management Category:

	Federal	State	County	Other Public	Tribal	Private	Total
Acres	837,000	108,000	34,000	2,000	< 500	126,000	1,107,000
% of FDn32	76%	10%	3%	0%	0%	11%	100%
% of Management Type	33%	11%	3%	10%	0%	5%	15%
% of NE Landscape	11%	1%	0%	0%	0%	2%	15%

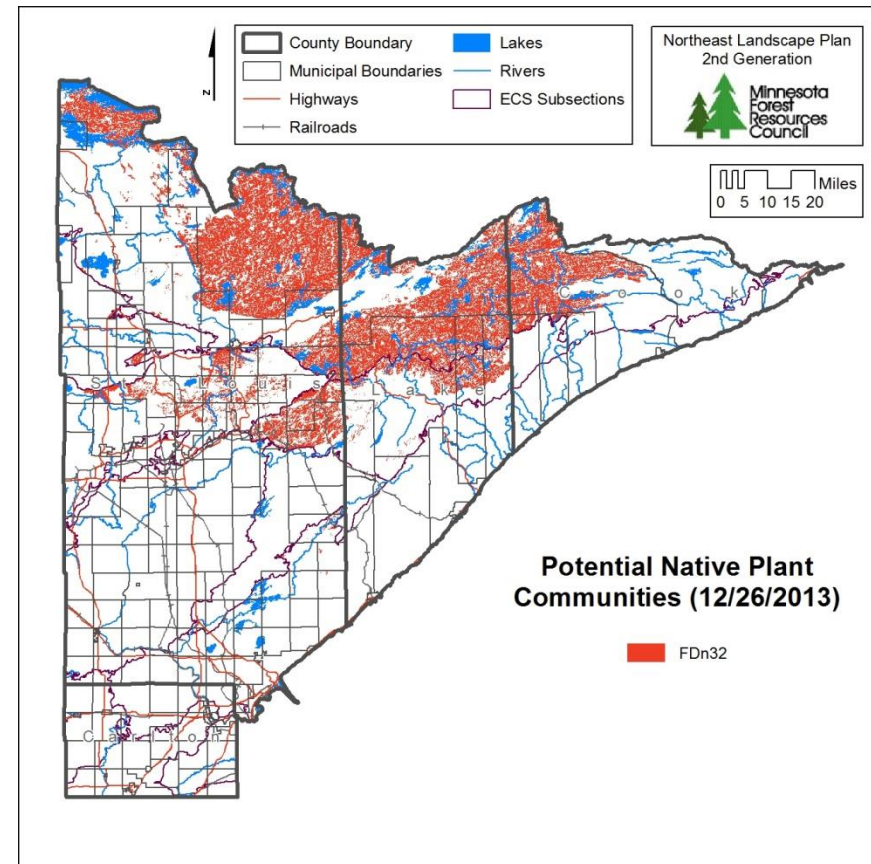
Source: Natural Resources Research Institute – University of Minnesota Duluth; report available at www.frc.state.mn.us

Long Term Goals:

- Increase jack pine component throughout all growth stages.
- Manage forests to ensure defensive spaces around communities and infrastructure.

Strategies:

- Manage for all growth stages of jack pine where it currently exists and on other potential jack pine sites.
- Maintain a regime of disturbance that emulates a natural pattern of fires.
- Ecological goals should be accomplished in BWCAW through natural fire if policy allows.
- Harvest in the transition and mature jack pine growth stages and restore jack pine through a variety of methods as site dictates (seeding, planting, prescribed fire).
- Encourage forest management, mechanical fuels treatment, and prescribed burning to reduce and/or manage fuel loading, particularly within wildland-urban interface areas.



FDn33: Northern Dry-Mesic Mixed Woodland

Description: Dry-mesic conifer, conifer-hardwood, or hardwood woodlands dominated by red pine, white pine, jack pine, black spruce, quaking aspen, or paper birch. Most common on sandy soils but also present on shallow, loamy soils over bedrock. Crown and surface fires were common historically.

Area:

- 118,000 acres
- 2% of the Northeast Landscape

Tree Suitability	Tree Species	Young (0-35)		Transition (35-55)		Mature (55-125)		~125		Old (> 125)	
		PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²
1d	Red Pine	17%	1%	↑	-	27%	1%	↓↓	-	16%	1%
2d	Paper Birch	16%	5%	↑	↑	19%	26%	↓	↓	14%	18%
3d	White Pine	--	0%	↑↑	↑	19%	1%	↑	↑↑	30%	19%
4d	(7wd) Quaking Aspen (Big-toothed) ³	40%	79%	↓↓	↓↓	9%	48%	↓	↓	7%	37%
5d	Jack Pine	15%	--	↓		7%	--	↓		2%	--
6	Balsam Fir	1%	7%	↑	↑	4%	11%	↑	↑	5%	15%
8wd	Red Maple	--	4%		↑	1%	9%		↓	2%	0%
10	(9) White Spruce (Black) ³	--	1%	↑	-	5%	1%	↑	-	13%	1%
	White Cedar	--	0%			2%	1%		↑	2%	8%
	Miscellaneous	11%	3%			7%	2%			9%	1%
11wd	Northern red oak										
Adapted from work done by MN DNR, Division of Forestry, Ecological Land Classification Program.											
For Table Interpretation: See p. 7-2 and 7-3											
¹ 6,807 Public Land Survey records for section and quarter-section corners (ca. 1846-1908 AD).											
² 2,615 FIA (1990 AD) subplots that were modeled to be FDn33 sites.											
³ Species could not be separated in the PLS data.											
Percent of NPC Class in Growth Stage		14%	30%	27%	30%	44%	39%			15%	1%

Land Management Category:

	Federal	State	County	Other Public	Tribal	Private	Total
Acres	4,000	6,000	23,000	1,000	< 500	84,000	118,000
% of FDn33	3%	5%	19%	1%	0%	71%	100%
% of Management Type	0%	1%	2%	4%	0%	3%	2%
% of NE Landscape	0%	0%	0%	0%	0%	1%	2%
Source: Natural Resources Research Institute – University of Minnesota Duluth; report available at www.frc.state.mn.us							



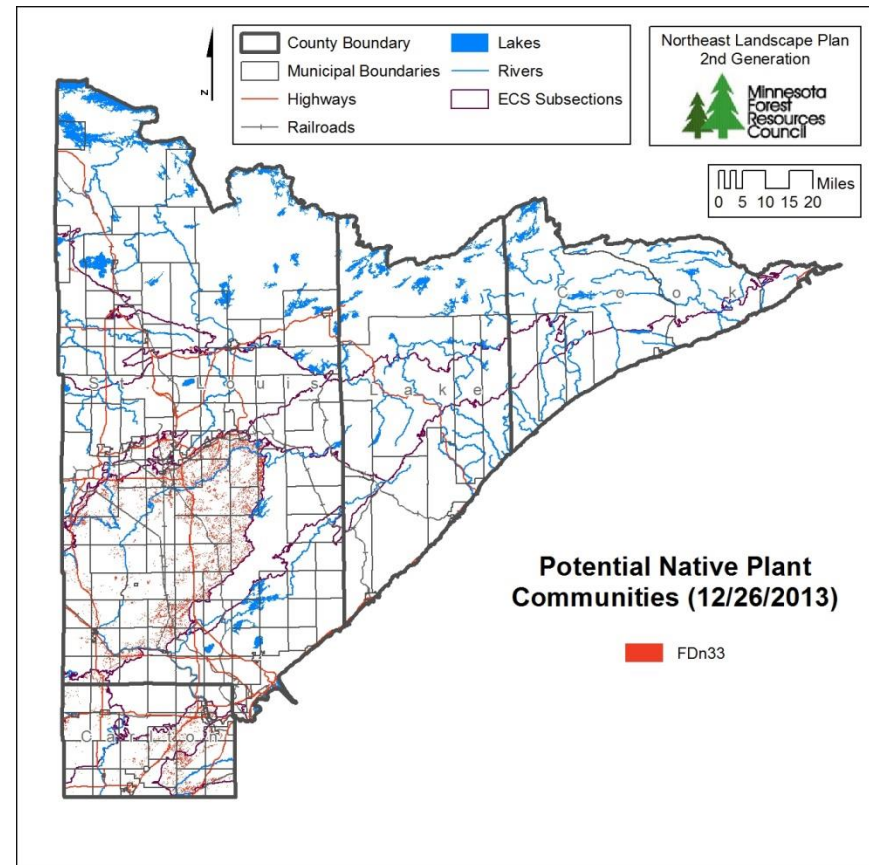
FDn33 – Northern Dry-Mesic Mixed Woodland
© MN DNR 2010

Long Term Goals:

- Increase the red and white pine components.
- Increase young growth stage (0-35 yrs) red pine.
- Increase characteristics found in the mature (55-125 yrs) and old (125+ yrs) growth stages of red and white pine.
- Manage forests to ensure defensive spaces around communities and infrastructure.
- Increased private land stewardship plans and cross-boundary implementation.

Strategies:

- Maintain a regime of disturbance that emulates a natural pattern of fires.
- Emphasize maintenance of stands that are currently dominated by white and red pine.
- Underplant with red and white pine during the transitional growth stage.
- Concentrate harvest activities in the mature growth stage (55-125 yrs) with emphasis on restoring pine on stands currently dominated by deciduous species.
- Identify areas that will be managed to enhance the old growth stage.
- Utilize techniques that recognize and adjust for deer browsing issues.
- Encourage forest management, mechanical fuels treatment, and prescribed burning to reduce and/or manage fuel loading, particularly within wildland-urban interface areas.
- Encourage the development of private forestland stewardship plans and plan implementation through cross-ownership forest management.



FDn43: Northern Mesic Mixed Forest

Description: Mesic pine, aspen, white cedar, or birch forests on loamy soils over bedrock in scoured bedrock uplands and on loamy, rocky, or sandy soils on glacial moraines, till plains, and outwash plains. Crown and severe surface fires were common historically.

Area:

- 2,520,000 acres
- 34% of the Northeast Landscape

Tree Suitability	Tree Species	Young (0-35)		Transition (35-55)		Mature (55-95)		Transition (95-115)		Old (> 115)	
		PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²
1wd	Paper Birch	15%	5%	↑	↑	31%	20%	↓	↓	18%	18%
2wd	White Pine	2%	0%	↑↑	↑	24%	1%	↑	↑	28%	3%
3wd	Quaking Aspen	60%	76%	↓↓	↓	12%	52%	↓	↓	5%	23%
4d	Red Pine	3%	0%	↑	↑	9%	1%	↓	-	5%	1%
5	White Cedar	-	0%	↑	-	3%	0%	↓	↑	2%	14%
6	Balsam Fir	1%	7%	↑	↑	10%	13%	↑	↑	13%	25%
7	White Spruce	-	1%	↑	↑	4%	2%	↑↑	-	28%	2%
8wd	Red Maple	-	3%	↑	↑	1%	4%	↓	↓	-	1%
9	Black Spruce	0%	0%	-	↑	0%	1%	-	↑	0%	6%
10	Jack Pine	19%	0%	↓	-	3%	0%	-	-	3%	0%
	Balsam Poplar	-	4%		↓	-	2%		-	-	2%
	Miscellaneous	0%	4%			3%	4%			0%	5%
Adapted from work done by MN DNR, Division of Forestry, Ecological Land Classification Program. For Table Interpretation: See p. 7-2 and 7-3 ¹ 11,725 Public Land Survey records for section and quarter-section corners (ca. 1846-1908 AD). ² 10,785 FIA (1990 AD) subplots that were modeled to be FDn43 sites.											
Percent of NPC Class in Growth Stage		17%	20%	30%	26%	31%	48%	6%	3%	16%	2%

Land Management Category:

	Federal	State	County	Other Public	Tribal	Private	Total
Acres	782,000	321,000	428,000	8,000	42,000	939,000	2,520,000
% of FDn43	31%	13%	17%	0%	2%	37%	100%
% of Management Type	31%	33%	36%	48%	56%	36%	34%
% of NE Landscape	11%	4%	6%	0%	1%	13%	34%
Source: Natural Resources Research Institute – University of Minnesota Duluth; report available at www.frc.state.mn.us							



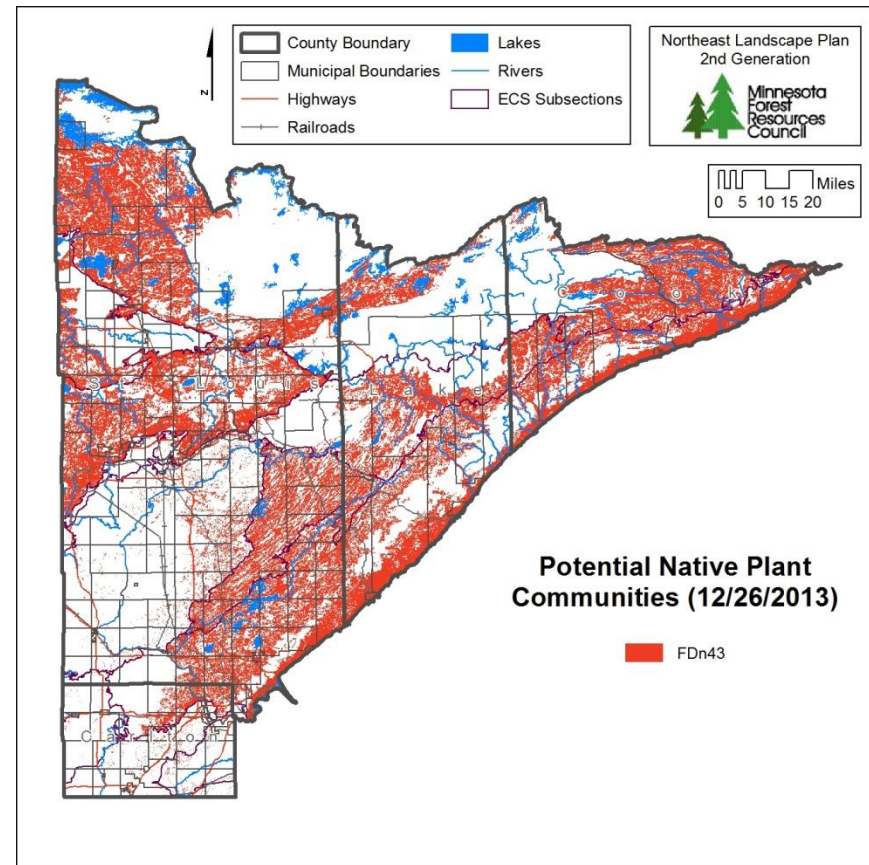
FDn43b – Northern Mesic Mixed Forest – Mesic Aspen-Birch
© MN DNR 2010

Long Term Goals:

- FDn43a: White-Red Pine Forest
 - o Increase the white and red pine component.
 - o Increase the mature and old growth stage of red and white pine.
- FDn43b: Aspen-Birch Forest
 - o Increase the white pine and white spruce component.
 - o On suitable sites where viable markets exist, manage forests for short-lived species such as aspen to provide perpetuation of the aspen/birch community.
- Manage forests to ensure defensive spaces around communities and infrastructure.
- Increased private land stewardship plans and cross-boundary implementation.

Strategies:

- Retain adequate conifers on harvest sites to ensure continued presence of conifers.
- Plant a mix of long-lived conifers post-harvest where sites and costs allow.
- Manage the young (0-35 yrs) and first transitional (35-55 yrs) growth stages for short-lived species to provide perpetuation of the aspen/birch community. Reduce aspen in the mature and old growth stages.
- Identify and manage a portion of the mature (55-95 yrs) growth stage for structural features found in the old (> 115 yrs) growth stage.
- Harvest by emulating a regime of natural fire disturbance patterns using regeneration harvest with variable retention of residuals.
- Encourage forest management, mechanical fuels treatment, and prescribed burning to reduce and/or manage fuel loading, particularly within wildland-urban interface areas.
- Encourage the development of private forestland stewardship plans and plan implementation through cross-ownership forest management.
- Develop collaborative efforts to reduce hydrologic impacts in the Lake Superior North and Lake Superior South watersheds.



Mesic Hardwood Forest NPC System (MH)

Description: Upland sites with moist nutrient rich soils that are usually protected from fire. They are characterized by continuous, often dense, canopies of deciduous trees, including sugar maple, basswood, paper birch, and northern red oak, and understories with shade-adapted shrubs and herbs. More information on this NPC System and associated NPC Classes including principal tree species can be found in Appendix D, Minnesota DNR ‘Field Guide to the Native Plant Communities of Minnesota’ or at:

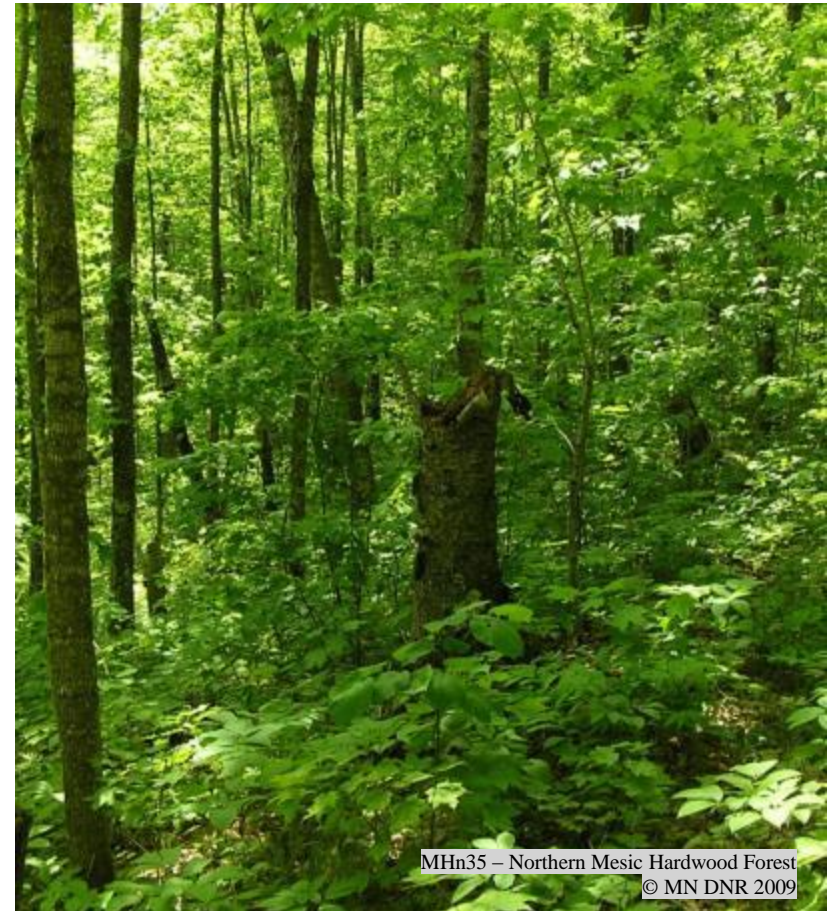
www.dnr.state.mn.us/npc/classification.html

Area:

- 839,000 acres
- 11 % of Northeast Landscape
- 18 % of the upland area in the Northeast Landscape

Disturbance Regime History:

- Low to very low rates of stand-replacing fire or wind disturbances historically with return intervals in excess of 400 years and often greater than 1,000 years.
- Moderate disturbances from light fires and patchy windthrow were frequent to occasional with return intervals ranging from 40 to 300 years.
- Many NPCs in this system, especially MHn45-47 have a very fine-grained disturbance pattern with few large patches of regenerating forest with small disturbance patches being the norm.

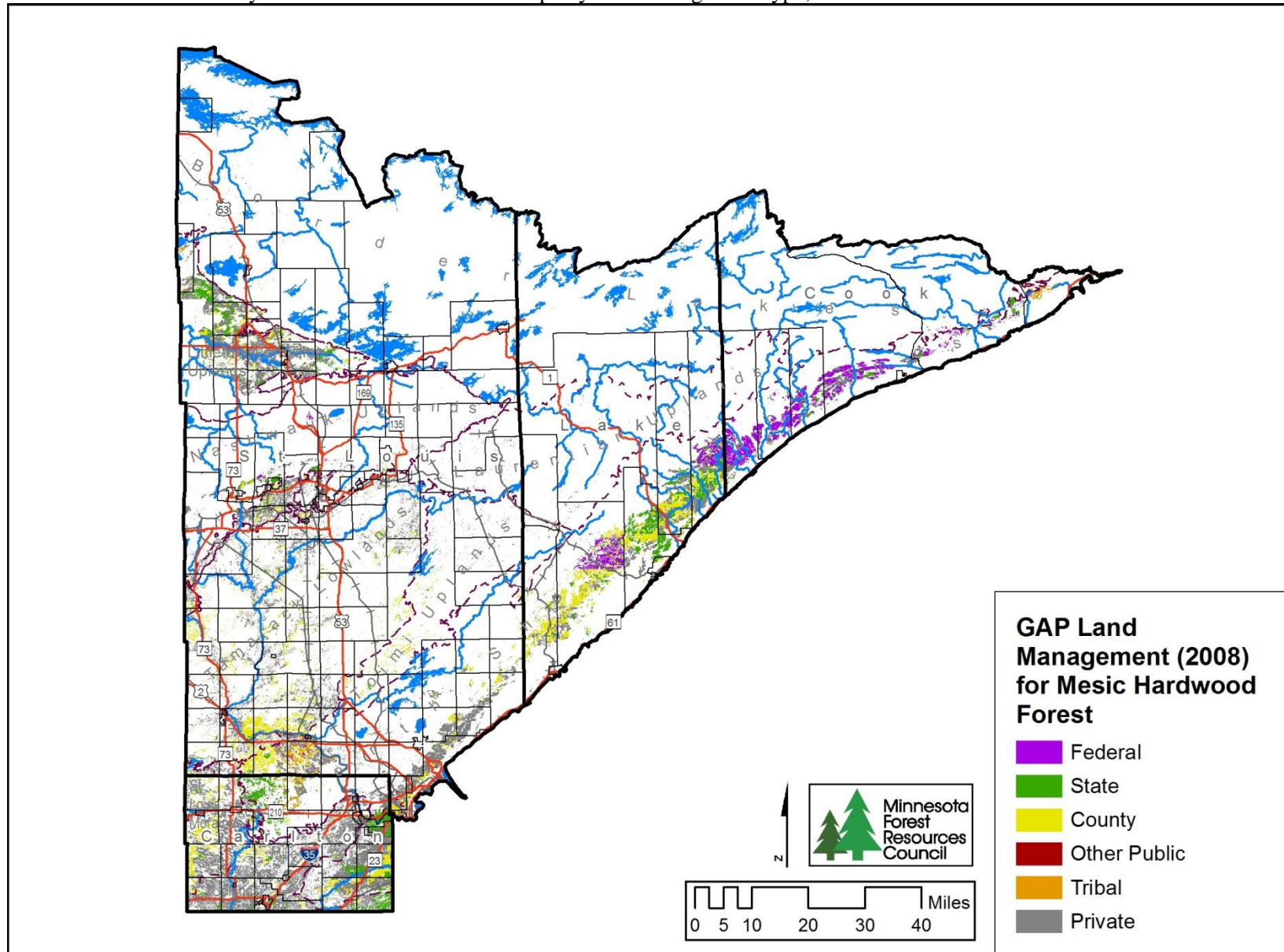


Land Management Category:

NPC Classes		Federal	State	County	Other Public	Tribal	Private	Total
MHn35	Northern Mesic Hardwood Forest	17,000	24,000	32,000	< 500	3,000	141,000	217,000
MHn44	No. Wet-Mesic Boreal Hardwood-Conifer Forest	6,000	46,000	75,000	1,000	2,000	257,000	387,000
MHn45	Northern Mesic Hardwood (Cedar) Forest	35,000	30,000	38,000	< 500	6,000	66,000	175,000
MH---	Other Mesic Hardwood Classes	11,000	7,000	15,000	< 500	1,000	26,000	60,000
	Total	69,000	107,000	160,000	2,000	12,000	490,000	839,000

Source: Natural Resources Research Institute – University of Minnesota Duluth; report available at www.frc.state.mn.us

Mesic Hardwood Forest System in the Northeast Landscape by land management type; 2008.



MHn35: Northern Mesic Hardwoods and MHn45: Northern Mesic Hardwoods (Cedar)

Description: MHn35: Mesic to dry-mesic hardwood forests on well-drained to moderately well-drained loamy soils, most often on stagnation moraines and till plains and less frequently on bedrock hills. MHn45: Mesic hardwood and hardwood-conifer forests on sandy-loam soils in fire-protected sites on rugged, scoured bedrock terrain.

Area:

- MHn35
 - 217,000 acres
 - 3% of the Northeast Landscape
- MHn45
 - 175,000 acres
 - 2% of the Northeast Landscape
- Combined
 - 392,000 acres
 - 5% of the Northeast Landscape



Land Management Category:

		Federal	State	County	Other Public	Tribal	Private	Total
MHn35	Acres	17,000	24,000	32,000	< 500	3,000	141,000	217,000
	% of MHn35	8%	11%	15%	0%	1%	65%	100%
	% of Management Type	1%	2%	3%	3%	4%	5%	3%
	% of NE Landscape	0%	0%	0%	0%	0%	2%	3%
MHn45	Acres	35,000	30,000	38,000	< 500	6,000	66,000	175,000
	% of MHn45	20%	17%	22%	0%	4%	38%	100%
	% of Management Type	1%	3%	3%	1%	8%	3%	2%
	% of NE Landscape	0%	0%	1%	0%	0%	1%	2%

Source: Natural Resources Research Institute – University of Minnesota Duluth; report available at www.frc.state.mn.us



MHn35 – Northern Mesic Hardwoods											
Tree Suitability	Tree Species	Young (0-55)		Transition (55-95)		Mature (95-205)		Transition (205-295)		Old (> 295) ³	
		PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²
1wd	Sugar Maple	11%	24%	↑	↑	14%	32%	↑↑	↑	29%	50%?
2wd	Basswood	6%	9%	↑	↑	9%	19%	↓	↓	6%	0%
3wd	Red Oak	10%	6%	↓	↑	5%	11%	↓	↓	1%	0%
4d	Paper Birch	38%	9%	↓↓	↓	28%	7%	↓↓	↓	12%	0%
5d	Quaking Aspen	20%	22%	↓↓	↑	6%	4%	↓	↓	4%	0%
6wd	Red Maple	--	9%		↓	--	4%		↓	0%	0%
8wd	Ironwood	1%	7%		-	1%	7%	-	↓	1%	0%
9d	White Pine	1%	0%	↑	↑	7%	1%	↑↑	↓	31%	0%
10wd	Bur Oak	1%	1%		↑	2%	3%		↑↑	0%	50%?
12	Balsam Fir	5%	4%	↓	↓	3%	2%	↓	↓	1%	0%
-	White Spruce ⁴	1%	1%	↑↑	↓	13%	0%	↓	↓	--	0%
	American Elm	3%	2%	↓	↑	2%	3%	↓	↓	0%	0%
	Miscellaneous	3%	6%			10%	7%			15%	0%
7wd	Big-toothed aspen										
11w	Yellow birch										
Adapted from work done by MN DNR, Division of Forestry, Ecological Land Classification Program. For Table Interpretation: See p. 7-2 and 7-3 ¹ 5,887 Public Land Survey records for section and quarter-section corners (ca. 1846-1908 AD). ² 3,470 FIA (1990 AD) subplots that were modeled to be MHn35 sites. ³ Just 4 FIA trees contributed to the old growth-stage and the results are unreliable. ⁴ Important historically, white spruce is no longer a significant component of MHn35 forests and is not covered in the accounts of potential crop species.											
Percent of NPC Class in Growth Stage		39%	29%	51%	52%	8%	18%	1%	1%	1%	0%

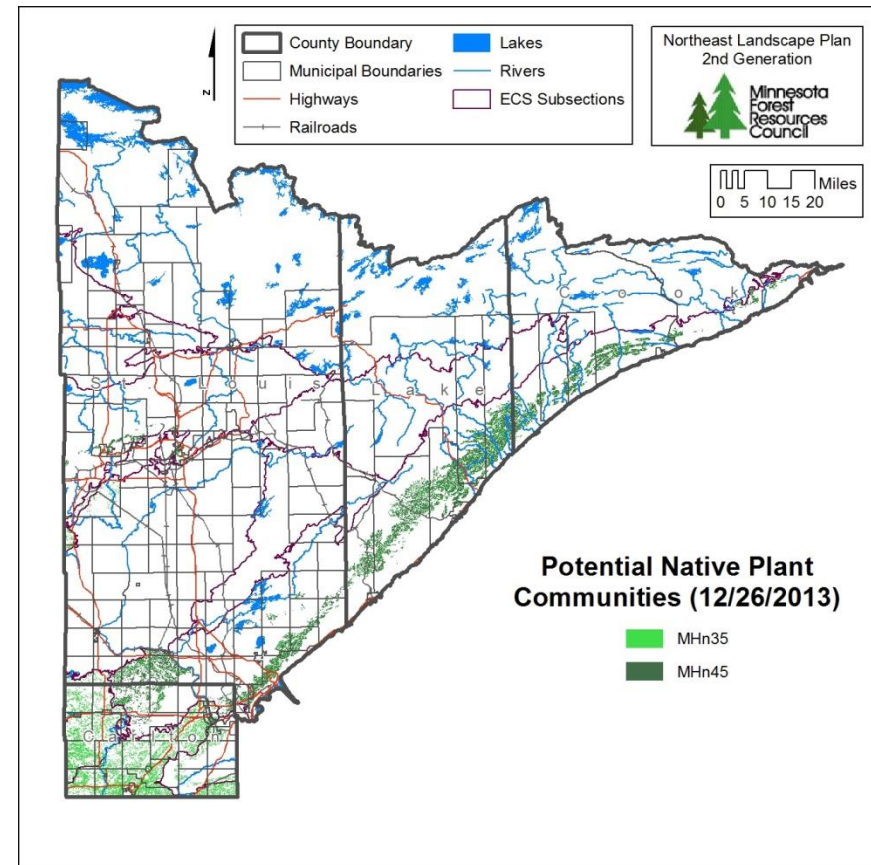
MHn45 – Northern Mesic Hardwoods (Cedar)											
Tree Suitability	Tree Species	Young (0-75)		Transition (75-95)		Mature (95-155)		Transition (155-195)		Very Old (> 195)	
		PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²
1wd	Sugar Maple	33%	17%	↓↓	↑	12%	34%	↓	↑	11%	38%
2w	Yellow Birch	22%	0%	↓	↑	11%	1%	↑	↓	15%	0%
3d	Paper Birch	13%	21%	↓	↓	6%	14%	↓	↓	–	13%
4	White Cedar	6%	0%	↑↑	↑	25%	5%	↓↓	↑↑	8%	25%
5wd	Basswood	2%	4%		↑	2%	6%		↓	1%	0%
6	White Spruce	6%	3%	↑↑	↓	37%	2%	↑↑	↑	54%	13%
7	Balsam Fir	11%	29%	↓	↓	4%	17%	↓	↓	2%	0%
8wd	Red Maple ³	--	3%		↑	--	5%		↓	--	0%
9d	Quaking Aspen	2%	19%		↓	--	7%		↓	0%	0%
	Black Spruce ³	--	0%		↑	--	3%		↓	--	0%
	Miscellaneous	5%	4%			3%	6%			9%	11%
10d	White pine										
-	Black ash										
Adapted from work done by MN DNR, Division of Forestry, Ecological Land Classification Program. For Table Interpretation: See p. 7-2 and 7-3 ¹ 4,074 Public Land Survey records for section and quarter-section corners (ca. 1846-1908 AD). ² 10,595 FIA (1990 AD) subplots that were modeled to be MHn45 sites. ³ Red maple and black spruce could not be separated in the PLS notes and were included with sugar maple and white spruce respectively in the PLS percentages.											
Percent of NPC Class in Growth Stage		29%	64%	16%	20%	38%	15%	3%	0%	14%	0%

Long Term Goals:

- Increase and/or maintain the white pine, yellow birch, paper birch, white spruce, and white cedar components.
- Expand or favor mesic hardwood forest types.
- Improve maple timber health and quality.
- Maintain critical habitats such as upland cedar.
- Increased private land stewardship plans and cross-boundary implementation.

Strategies:

- Encourage the use of silviculture systems that support the range of species and structural diversity characteristic of this native plant community.
- Apply uneven-aged management in the first transitional growth stage to increase characteristics of the multi-aged mature and old growth stages.
- Apply even-age management in the first transitional growth stage to maintain younger age classes.
- Use residual cedar and old forest remnants as reserve patches.
- Encourage the development of private forestland stewardship plans and plan implementation through cross-ownership forest management.
- Utilize techniques that recognize and adjust for deer browsing issues.
- Maintain an adequate amount of canoe-quality paper birch.



MHn44: Northern Wet-Mesic Boreal Hardwood-Conifer Forest

Description: Wet-mesic or mesic hardwood and hardwood-conifer forests, most commonly on level, clayey sites with high local water tables on glacial lake deposits, stagnation moraines, and till plains.

Area:

- 387,000 acres
- 5% of the Northeast Landscape

Tree Suitability	Tree Species	Young (0-35)		Transition (35-95)		Mature (95-195)		~195		Old (> 195)	
		PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²
1d	Quaking Aspen	86%	78%	↓↓	↓↓	24%	40%	↑	↑	28%	43%
2	Balsam Fir	3%	5%	↑	↑	10%	17%	-	↓	10%	16%
3wd	Red Maple	1%	3%	-	↓	1%	2%		↓	1%	0%
4d	Paper Birch	5%	3%	↑	↑	18%	14%	↓	-	12%	14%
5wd	Basswood	--	1%		-	1%	1%		↓	1%	0%
6	White Spruce	1%	0%	↑↑	↑	34%	1%	↓	↓	33%	0%
7	White Cedar	--	0%		↑	1%	4%		↑	1%	18%
8d	White Pine	--	0%	↑	↑	1%	4%	↑	↓	4%	2%
9w	Black Ash	1%	2%	-	-	1%	2%		↑	--	5%
10	Balsam Poplar	1%	6%		↓	--	3%		↓	1%	2%
11wd	Red Oak	--	0%		↑	--	1%		↓	1%	0%
12wd	Bur Oak	1%	1%	-	↑	1%	2%		↓	2%	0%
	Miscellaneous	2%	2%			9%	12%			9%	0%
13wd	Sugar Maple										
14w	Green Ash										
15d	Red Pine										
-	American Elm										

Adapted from work done by MN DNR, Division of Forestry, Ecological Land Classification Program.
 For Table Interpretation: See p. 7-2 and 7-3
¹ 4,074 Public Land Survey records for section and quarter-section corners (ca. 1846-1908 AD).
² 10,595 FIA (1990 AD) subplots that were modeled to be MHn44 sites.

Percent of NPC Class in Growth Stage	24%	21%	60%	75%	14%	4%			2%	0%
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Land Management Category:

	Federal	State	County	Other Public	Tribal	Private	Total
Acres	6,000	46,000	75,000	1,000	2,000	257,000	387,000
% of MHN44	2%	12%	19%	0%	1%	66%	100%
% of Management Type	0%	5%	6%	5%	3%	10%	5%
% of NE Landscape	0%	1%	1%	0%	0%	3%	5%

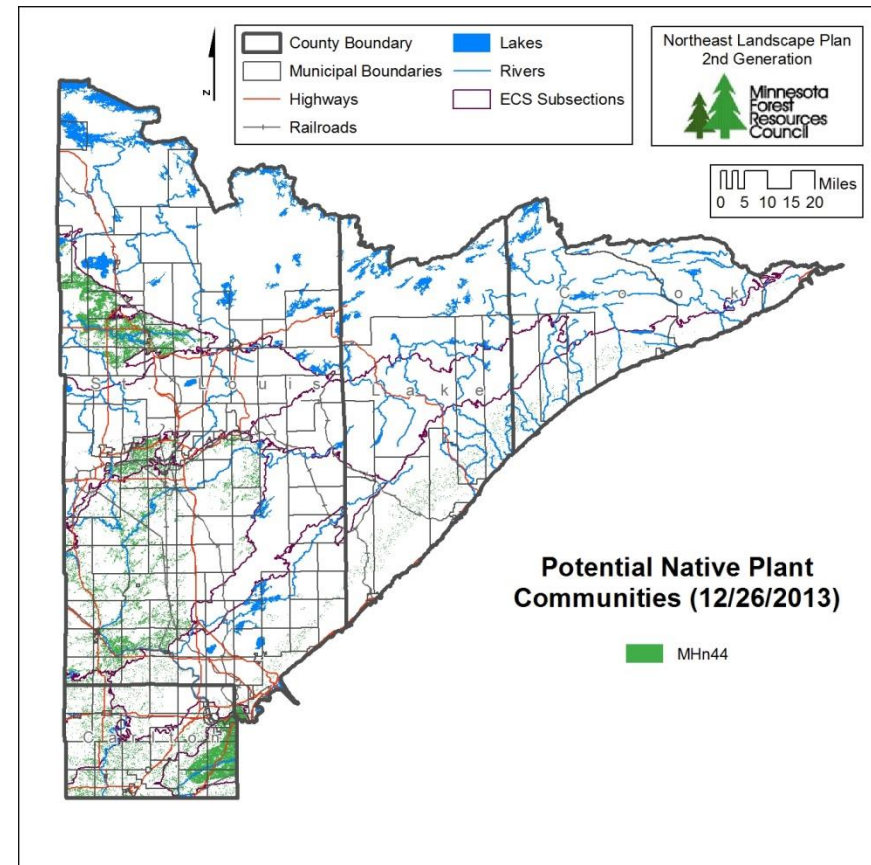
Source: Natural Resources Research Institute – University of Minnesota Duluth; report available at www.frc.state.mn.us

Long Term Goals:

- Increase the white spruce component in the mature and old growth stages.
- Maintain a healthy and productive aspen component in the young growth stage.

Strategies:

- Harvest by mimicking natural patterns of disturbance using regeneration harvest with variable retention of residuals.
- Reinitiate declining aspen stands to the young growth stages.
- Select acres in the transitional (35-95 yrs) growth stage for underplanting white spruce at rates that are representative of its natural range.
- Identify and manage a portion of the transitional growth stage for structural features found in the mature and old growth stage.
- Encourage the development of private forestland stewardship plans and plan implementation through cross-ownership forest management.



Acid Peatland NPC System (AP)

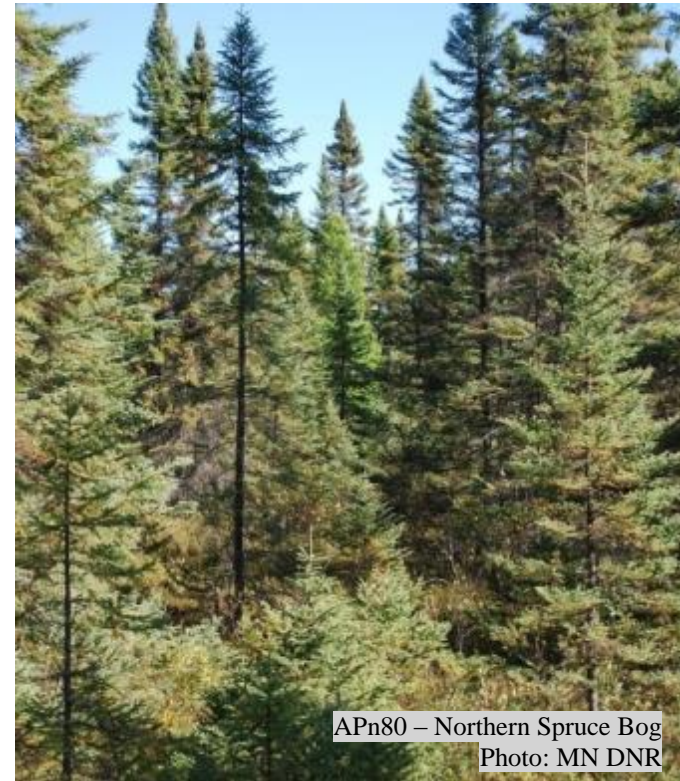
Description: The Acid Peatland (AP) System is characterized by conifer-, low-shrub, or graminoid dominated communities that develop in association with peat-forming Sphagnum. AP communities are often located in poorly drained level basins such as expansive glaciated lake beds and isolated depressions. Can also be found in narrow zones along lakes, rivers, and peatlands. AP communities are acidic (pH < 5.5), extremely low in nutrients, and have hydrological inputs dominated by precipitation rather than groundwater. More information on this NPC System and associated NPC Classes including principal tree species can be found in Appendix D, Minnesota DNR ‘Field Guide to the Native Plant Communities of Minnesota’ or at: www.dnr.state.mn.us/npc/classification.html

Area:

- 589,000 acres
- 8 % of Northeast Landscape
- 21 % of the lowland area in the Northeast Landscape

Disturbance Regime History:

- Return interval of stand-replacing fires (rare) – over 1,000 years.
- Return interval of superficial or light fires – approximately 120 years.
- Return interval of catastrophic windthrows – over 700 years.

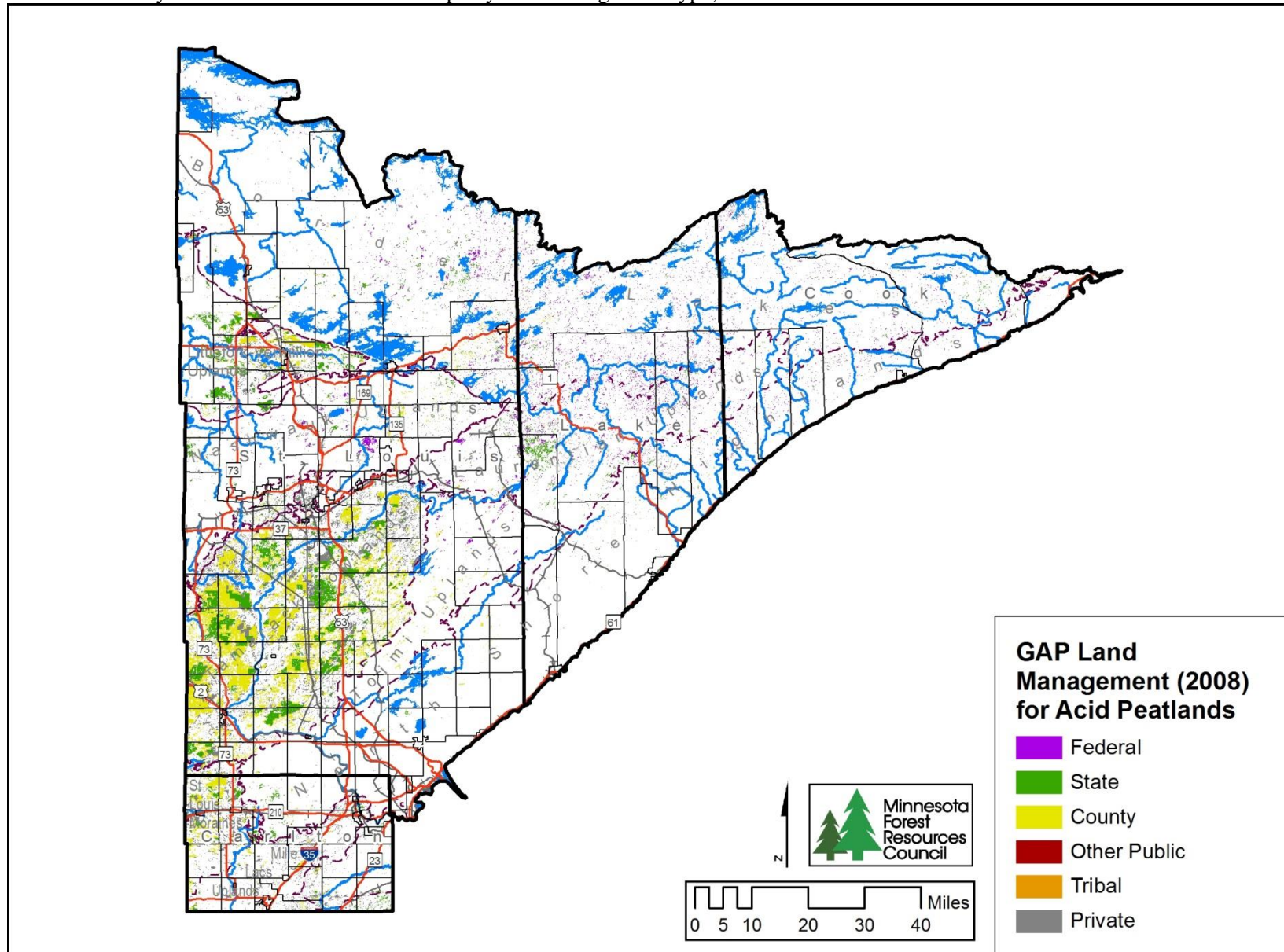


APn80 – Northern Spruce Bog
Photo: MN DNR

Land Management Category:

AP - Acid Peatland - No class assigned	Federal	State	County	Other Public	Tribal	Private	Total
Acres	62,000	145,000	210,000	1,000	1,000	169,000	589,000
% of AP System	11%	25%	36%	0%	0%	29%	100%
% of Management Type	2%	15%	18%	3%	1%	7%	8%
% of NE Landscape	1%	2%	3%	0%	0%	2%	8%
Source: Natural Resources Research Institute – University of Minnesota Duluth; report available at www.frc.state.mn.us							

Acid Peatland System in the Northeast Landscape by land management type; 2008.



Long Term Goal:

- Maintain this community on the landscape.

Strategies:

- Use forest management to reduce threats of forest pests and pathogens (e.g. mistletoe).
- Proactively manage sites that are likely to decline to community types more tolerant of future climate conditions while reserving some areas as possible refugia sites.
- Support sustainable harvest of specialty forest products.

APn81 – Northern Poor Conifer Swamp							
Tree Suitability	Tree Species	Young (0-55)		~55		Mature (>55)	
		PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²
1d	Black Spruce	21%	59%	↑	↑	27%	66%
2	Tamarack	77%	29%	↓	↓	67%	24%
	Balsam Fir	--	5%		↓	1%	3%
	White Cedar	--	2%		↑	2%	3%
	Miscellaneous	2%	5%			3%	4%
3wd	White Pine						
-	Paper Birch						
Adapted from work done by MN DNR, Division of Forestry, Ecological Land Classification Program. For Table Interpretation: See p. 7-2 and 7-3 ¹ 3,818 Public Land Survey records for section and quarter-section corners (ca. 1846-1908 AD). ² 4,961 FIA (1990 AD) subplots that were modeled to be APn81 sites.							
Percent of NPC Class in Growth Stage		35%	41%			65%	59%

APn80 – Northern Spruce Bog						
Tree Suitability	Tree Species	Young			Mature	
		PLS	FIA		PLS	FIA
1d	Black Spruce	No Growth Stage Data Available				
2	Tamarack					
Source: MN DNR, Division of Forestry, Ecological Land Classification Program.						

Forested Rich Peatland NPC System (FP)

Description: Forested Rich Peatland (FP) communities are conifer- or tall shrub-dominated wetlands on deep, actively forming peat in poorly drained level basins. They receive inputs of water from both groundwater and precipitation, leading to less acidic conditions than acid peatlands and are characterized by mossy ground layers, often with abundant shrubs and forbs. More information on this NPC System and associated NPC Classes including principal tree species can be found in Appendix D, Minnesota DNR ‘Field Guide to the Native Plant Communities of Minnesota’ or at: www.dnr.state.mn.us/npc/classification.html

Area:

- 1,111,000 acres
- 15 % of Northeast Landscape
- 40 % of the lowland area in the Northeast Landscape

Disturbance Regime History:

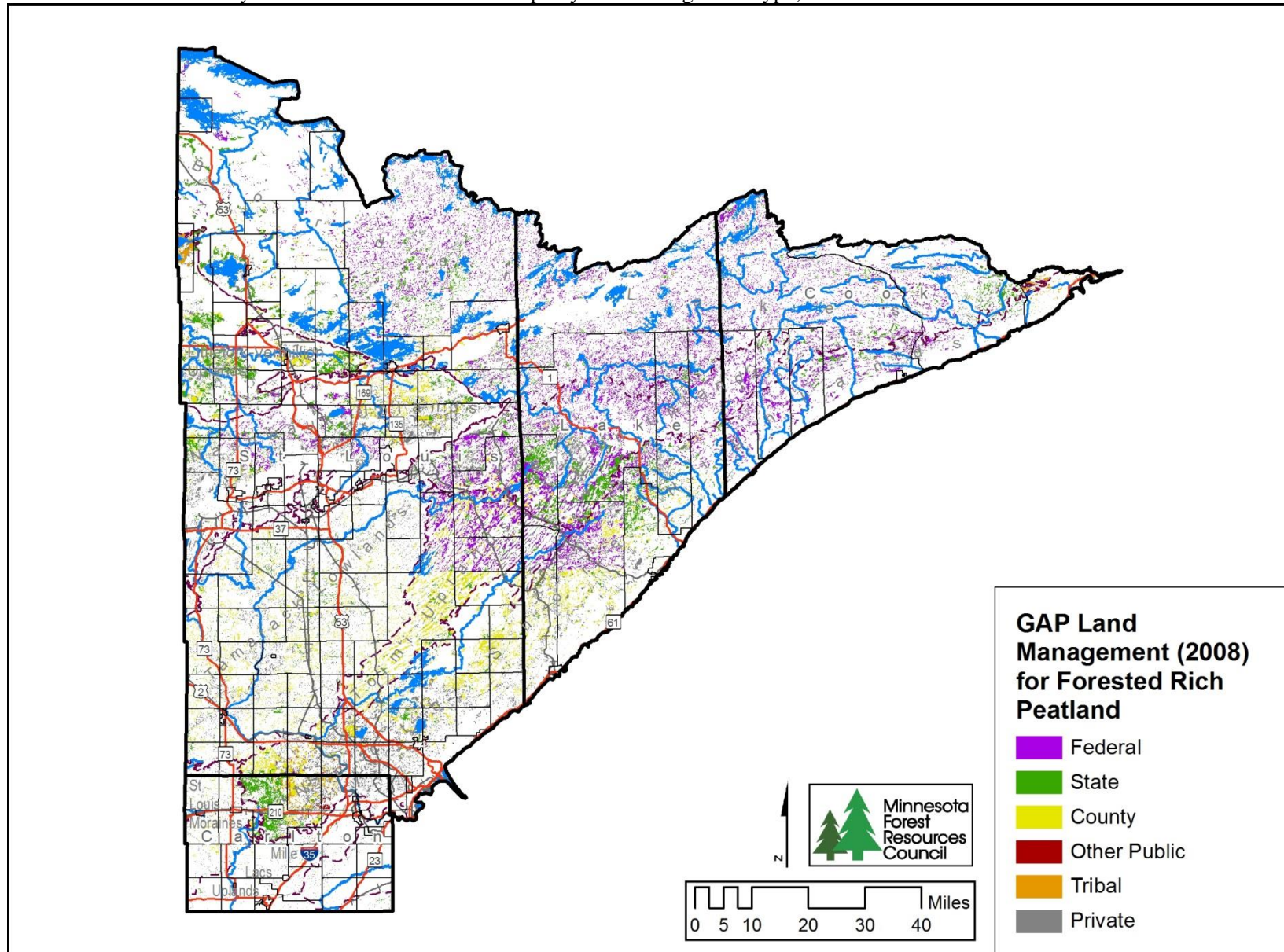
- Return interval of stand-replacing fires (very rare) – 400 to 1,000 years.
- Return interval of catastrophic windthrows – over 600 years.
- Return interval of patchy windthrows – approximately 80 years.



Land Management Category:

FP - Forested Rich Peatland - No class assigned	Federal	State	County	Other Public	Tribal	Private	Total
Acres	365,000	212,000	196,000	3,000	16,000	320,000	1,111,000
% of FP System	33%	19%	18%	0%	1%	29%	100%
% of Management Type	14%	21%	17%	17%	22%	12%	15%
% of NE Landscape	5%	3%	3%	0%	0%	4%	15%
Source: Natural Resources Research Institute – University of Minnesota Duluth; report available at www.frc.state.mn.us							

Forested Rich Peatland System in the Northeast Landscape by land management type; 2008.



Long Term Goals:

- Maintain forest cover in this plant community.
- Reduce tamarack mortality.

Strategies:

- Actively manage productive timberland sites to reduce threats of pathogens. Use even aged management of black spruce and tamarack for timber production and forest health where conditions are suitable for regeneration, including harvests designs to address eastern larch beetle and mistletoe management.
- Proactively manage sites that are likely to decline to community types more tolerant of future climate conditions while reserving some areas as possible refugia sites. There is more opportunity for site adaptation if the system is on flowing water vs if the system is on trapped or perched water table.
- Support sustainable harvest of specialty forest products.
- Encourage natural regeneration of white cedar cover types.

FPn82 – Northern Rich Tamarack Swamp							
Tree Suitability	Tree Species	Young (0-55)		~55		Mature (>55)	
		PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²
1	Tamarack	80%	39%	↓↓	↑↑	66%	57%
2	Black Spruce	12%	56%	↑↑	↓↓	20%	38%
3d	White Cedar	2%	2%	↑	↑	7%	3%
	Miscellaneous	6%	3%			7%	2%
-	White Pine						
Adapted from work done by MN DNR, Division of Forestry, Ecological Land Classification Program. For Table Interpretation: See p. 7-2 and 7-3 ¹ 2,840 Public Land Survey records for section and quarter-section corners (ca. 1846-1908 AD). ² 1,542 FIA (1990 AD) subplots that were modeled to be FPn82 sites.							
Percent of NPC Class in Growth Stage		23%	60%			77%	40%

FPn62 - Northern Rich Spruce Swamp	FPn63 - Northern Cedar Swamp	FPn71 - Northern Rich Spruce Swamp	FPn72 - Northern Rich Tamarack Swamp	FPn81 - Northern Rich Tamarack Swamp	Tree Species	Young			Mature	
Tree Suitability						PLS	FIA		PLS	FIA
1	2	1d	2	2d	Black spruce	No Growth Stage Data is Available for these NPC Classes				
2	4	2	1	1	Tamarack					
3wd	5wd		3wd		Paper birch					
4	1	3d			White cedar					
5d	3d				Balsam fir					
-			-		White pine					
-			-		White spruce					
			-		American elm					
			-		Black ash					
Source: MN DNR, Division of Forestry, Ecological Land Classification Program.										

Wet Forest NPC System (WF)

Description: Wet Forest (WF) communities occur commonly in narrow zones along the margins of lakes, rivers, and peatlands; they also occur in shallow depressions or other settings where the groundwater table is almost always within reach of plant roots but does not remain above the mineral soil surface for long periods during the growing season. More information on this NPC System and associated NPC Classes including principal tree species can be found in Appendix D, Minnesota DNR ‘Field Guide to the Native Plant Communities of Minnesota’ or at:

www.dnr.state.mn.us/npc/classification.html

Area:

- 312,000 acres
- 4 % of Northeast Landscape
- 11 % of the lowland area in the Northeast Landscape

Disturbance Regime History:

- Return interval of catastrophic fires – 800 to >1,000 years.

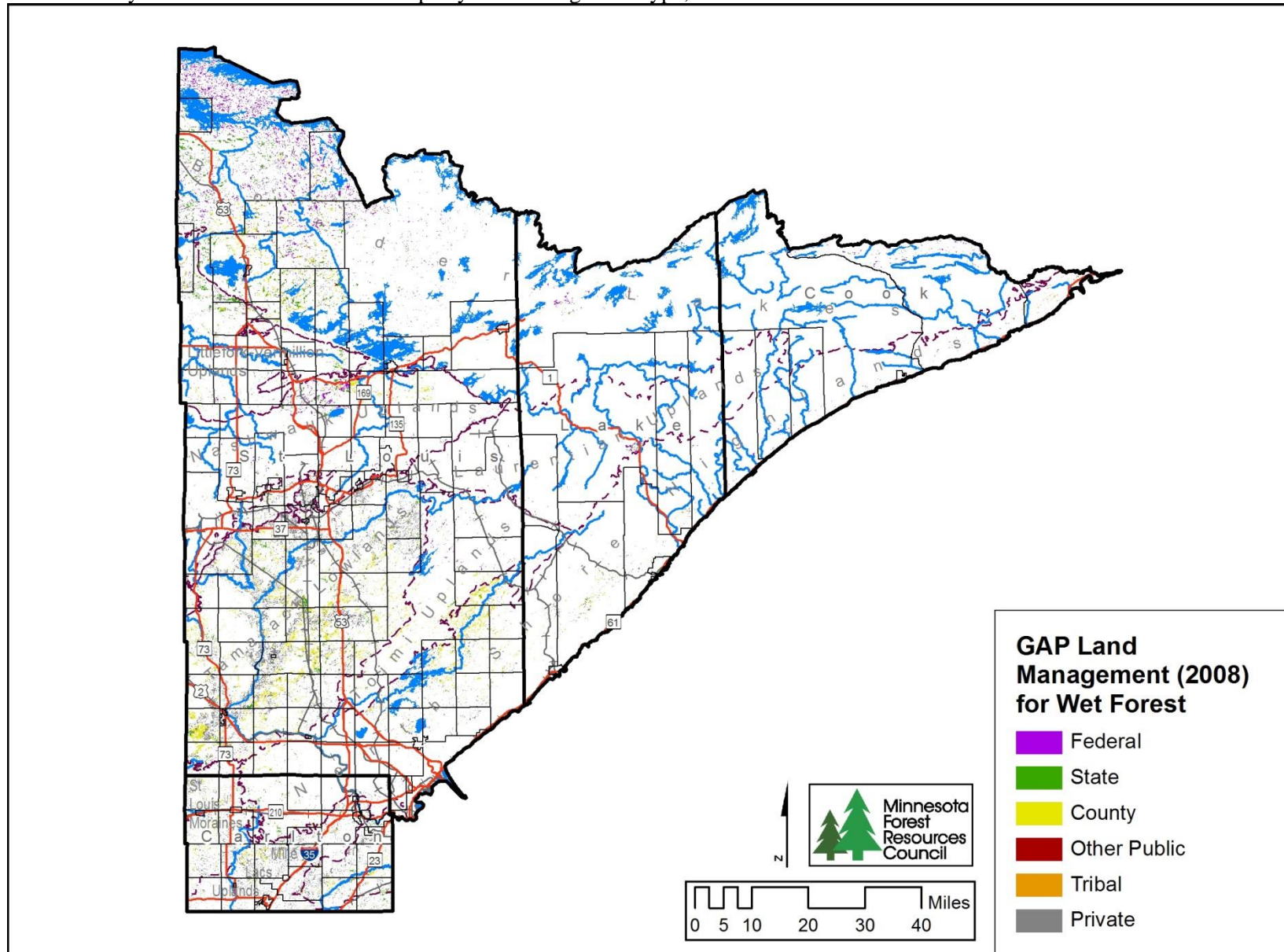


WFn64 – Northern Very Wet Ash Swamp
Photo: MN DNR

Land Management Category:

WF – Wet Forest - No class assigned	Federal	State	County	Other Public	Tribal	Private	Total
Acres	38,000	40,000	79,000	1,000	1,000	152,000	312,000
% of WF System	12%	13%	25%	0%	0%	49%	100%
% of Management Type	2%	4%	7%	3%	2%	6%	4%
% of NE Landscape	1%	1%	1%	0%	0%	2%	4%
Source: Natural Resources Research Institute – University of Minnesota Duluth; report available at www.frc.state.mn.us							

Wet Forest System in the Northeast Landscape by land management type; 2008.



WFn64 – Northern Very Wet Ash Swamp											
Tree Suitability	Tree Species	Young (0-75)		~75		Mature (75-135)		~135		Old (> 135)	
		PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²
1w	Black Ash	72%	55%	↓	↑	71%	56%	↓	↓	56%	36%
2	Tamarack	1%	0%	↑	-	2%	0%	↑	-	12%	0%
3d	Quaking Aspen	2%	6%	↓	↓	1%	4%	↓	↓	--	3%
4	White Cedar	1%	1%	↑	↑	8%	7%	↓	↑↑	4%	31%
5wd	Yellow Birch	1%	0%	-	↑	1%	1%	↓	↑	--	3%
6wd	Red Maple	1%	1%	-		1%	--	-		1%	0%
7d	Paper Birch	4%	4%	↓	↑	3%	5%	-	↓	3%	4%
8wd	American Elm	6%	6%	↓	↑	5%	7%	↑	↓	6%	4%
9d	Balsam Fir	6%	16%	↓	↓	1%	12%	↑	↑	2%	16%
-	White Spruce	1%	1%	↑	-	5%	1%	↑	-	13%	1%
	Balsam Poplar	1%	8%		↓	--	4%		↓	0%	1%
	Miscellaneous	6%	3%			4%	4%			4%	4%
10wd	Red Elm										
Adapted from work done by MN DNR, Division of Forestry, Ecological Land Classification Program. For Table Interpretation: See p. 7-2 and 7-3 ¹ 1,113 Public Land Survey records for section and quarter-section corners (ca. 1846-1908 AD). ² 1,831 FIA (1990 AD) subplots that were modeled to be WFn64sites.											
Percent of NPC Class in Growth Stage		55%	51%			35%	40%			10%	9%

WFn53 – Northern Wet Cedar Forest											
Tree Suitability	Tree Species	Young (0-55)		Transition (55-75)		Mature (75-105)		Transition (105-155)		Old (> 155)	
		PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²	PLS ¹	FIA ²
1	White Cedar	18%	11%	↑↑	↑↑	67%	46%	↓↓	↑	26%	55%
2w	Black Ash	7%	45%	↓	↓↓	4%	20%	↓	↓	3%	12%
3d	Paper Birch	8%	7%	-	↓	8%	5%	↓	↑	5%	6%
4d	Balsam Fir	52%	24%	↓↓	↓	7%	17%	↑↑	↑	21%	18%
6d	(5) White Spruce (incl. Black) ³	3%	2%	↑	↑	7%	4%	↑↑	↓	23%	2%
7d	Balsam Poplar	3%	9%		↓	2%	4%		↓	2%	3%
-	Tamarack	2%	0%	↓	↑	11%	2%	↑↑	↓	11%	0%
	Miscellaneous	5%	2%			4%	0%			9%	4%
8wd	Yellow Birch										
9d	Quaking Aspen										
Adapted from work done by MN DNR, Division of Forestry, Ecological Land Classification Program. For Table Interpretation: See p. 7-2 and 7-3 ¹ 1,505 Public Land Survey records for section and quarter-section corners (ca. 1846-1908 AD). ² 2,746 FIA (1990 AD) subplots that were modeled to be WFn53 sites. ³ Species could not be separated in the PLS data.											
Percent of NPC Class in Growth Stage		7%	22%	10%	15%	34%	23%	15%	26%	9%	14%

Long Term Goals:

- Increase tamarack and white spruce component.
- Manage black and green ash within the context of the spread of emerald ash borer.
- Protect critical forest habitats, especially white cedar cover types and riparian forests along cold water streams.
- Maintain forest land cover in order to protect and maintain water table levels.

Strategies:

- Plan harvests so as to maintain diversity of canopy and sub-canopy species.
- Manage ash through EAB guidelines. Facilitate species transitions where EAB infestations are likely.
- Encourage natural regeneration of white cedar cover types on sites anticipated to remain favorable under a range of future conditions.
- Focus on seed sources between systems at the upland and lowland interface to increase adaptability.
- Coordinate management and road construction across ownership on a watershed basis to protect hydrologic sustainability.
- Increase resiliency by proactively managing ash stands through selective harvesting and development/utilization of emerging ash markets.

WFn55 – Northern Wet Ash Swamp						
Tree Suitability	Tree Species	Young			Mature	
		PLS	FIA		PLS	FIA
1w	Black ash	No Growth Stage Data is Available for this NPC Class				
2d	Quaking aspen					
3wd	Yellow birch					
4	White cedar					
5wd	Green ash					
6wd	Red maple					
7d	Balsam poplar					
8d	Paper birch					
9d	Balsam fir					
10wd	Basswood					
11wd	American elm					
12d	White pine					
13	Black spruce					
14wd	Bur oak					
15d	White spruce					
-	Tamarack					
-	Sugar maple					

Part 3. Operationalizing the Plan: How will we get there?

Section 8

Coordination and Implementation Framework



A critical component of any planning document is the section that describes how the “*vision*” will be implemented. Successful implementation of a regional plan that affects dozens of agencies and organizations and thousands of private interests requires clear and useful guidance on coordination. The purpose of this section is to outline the organizational structures and coordinative strategies that the Planning Committee believes are necessary to support the successful implementation of this Plan.

A. How Will this Plan Get Implemented? Increasing Success through Coordination

How will the ideas suggested in this Part 2 of this Plan get done? Who will do the work? How much will it cost? How long will it take?

As with past successes in forest management, the ways things get done is through **cooperation, coordination, and collaboration**. This Plan proposes to significantly increase and enhance the ways that interested persons and stakeholder groups can work together to implement sustainable forest management across the Northeast Landscape.

It is important to remember the regional context of this document and its primary role is to coordinate and facilitate sustainable forest management by the vested stakeholders. The primary work on the ground across the millions of acres in the Northeast Landscape will continue to be done by foresters and loggers, contractors, land managers, resource agency staff, forest products industry, individual landowners, local officials, among others.

While the **planning horizon** for MFRC Landscape Plans typically span 100 years or longer, the **implementation horizon** for this Plan is ten to twenty years. After five to ten years, parts of the Plan will need to be reconsidered as changes merit. The MFRC and the Committee should collectively determine the point at which this Plan needs to be either amended or updated as time moves forward.

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B. Coordination Strategies

Implementation of Landscape Plans

Regional committees meet on a regular basis to coordinate land management activities and support the development and implementation of collaborative projects. In general terms, the MFRC Landscape Plans are implemented through four basic approaches including:

- Encourage consideration of the landscape-level context by all agencies, organizations, industry, and private landowners when developing their resource management plans and implementation projects.
- Coordinate and support projects by partnering organizations that promote sustainable forest management practices in the Landscape.
- Develop and implement committee led projects that proactively address the goals and strategies outlined in the Landscape Plans.
- Monitor activities and outcomes of projects implemented by the Committees, as well as those by partnering organizations and landowners across the landscape.

Recommended Coordination Strategies

By working through a series of coordinated strategies with stakeholders in the region, each partnering entity that participates in the coordination and implementation of this Plan will more likely experience increased benefits over time. The following is a list of coordination strategies that are described further in this section to significantly enhance the implementation of this Plan:

1. Reconvene the Northeast Coordination Committee
2. Review Northeast Committee Membership and Operations
3. Promote Implementation of the Landscape Plan through Partners' Plans
4. Actively Support the Forest Policy Development Process
5. Develop Regional Priorities to Guide Implementation in the Region
6. Promote Cross Boundary Projects

Strategy # 1. Reconvene the Northeast Coordination Committee

One of the primary ways that the MFRC sustains the Landscape Program is through its ongoing funding and staffing support of the regional committees. This allows the regional committees to support the coordination, implementation, and monitoring of the landscape plans.

It should be noted that the Northeast Coordination Committee intentionally stopped meeting during the development of this Plan to allow adequate time and energy from partners in preparing this Plan. With the approval of this Plan, the Northeast Coordination Committee should be reconvened to begin the next generation of coordination and implementation efforts.

Strategy # 2. Review and Update the Northeast Coordination Committee Membership and Operations

With the reconvening of the Northeast Coordination Committee, it would be an appropriate time for the Coordination Committee to review its membership and operations. The Coordination Committee should also address the budgetary needs to support the implementation of the Plan.

A draft operations guide has been developed as a part of this planning process to help enhance the efficiency and effectiveness of the Coordination Committee. The operations guide is based on a series of operational protocols and procedures developed incrementally by the MFRC, its Landscape Committee, and the Coordination Committee has over the past ten years. The reconvened Coordination Committee should review and refine this draft document to address its future operational needs.

Funding for the MFRC and its programs, including the Landscape Program comes from the state general fund. The MFRC operating budget has and will likely continue to support staffing to the basic operations of the Landscape Program and the regional committees. To remain effective, continued funding from the state's general fund for the Landscape Program and the MFRC overall is essential.

In addition to the operating budget, the MFRC budget has provided seed moneys to the regional committees. These funds, while relatively small, are designed to help initiate projects in each region developed by the regional committees. In the Northeast region, these funds have been used to help support some of the opportunity area projects and match outside grant funds.

While the Landscape Program budget has not been designed to be a primary source of implementation dollars, the seed funding has helped to leverage additional funds for sustainable forest projects in the region. As the Coordination Committee begins its second generation of coordination and implementation efforts, securing additional funding will be critical to the successful implementation of this Plan.

Strategy # 3. Promote Implementation of the Landscape Plan through Partners' Plans

One of the primary ways that MFRC landscape plans are implemented is through the integration of goals and strategies from the landscape plans into the forest management plans developed by partners in the region. The Coordination Committee should actively encourage all agencies, organizations, industry, and private landowners to integrate the goals from this Plan into their resource management plans and implementation projects. The Coordination Committee should:

- Review existing and proposed forest management plans and see how they fit with landscape goals. Documents to review include: the Superior National Forest Plan, DNR Subsection Forest Resource Management Plans, County Land Dept. Plans, private industrial forest plans, tribal forest management plans, and family forest landowner stewardship plans.
- Determine how much each landowner can voluntarily contribute toward the landscape goals on a yearly basis.
- Look for ways to cooperate and coordinate on the ground management activities to achieve landscape goals.
- Analyze the cumulative effects of current and planned activities across the Landscape.
- Coordinate risk assessments across agencies and organizations.
- Assist MFRC staff in collecting necessary monitoring information as described in the Monitoring Framework” of this Plan.

Strategy # 4. Actively Support the Forest Policy Development Process

As established in the SFRA, the landscape committees are to provide regional perspectives to the Council on sustainable forestry matters. With this assigned responsibility, the regional committees continue to play a critical role in shaping forest policy in Minnesota. The Coordination Committee can support this by providing recommendations to the MFRC in the future as a part of their strategic forest policy development program or on relevant forest policy matters.

As a part of the development of the second generation Northeast Landscape Plan, the Planning Committee developed an outline of recommendations to assist people from these entities in finding specific strategies that apply to their organizations or personnel interests (see “Recommendations to Agencies and Organizations”). Most if not all of these recommendations will require efforts beyond the scope and capacity of the Coordination Committee to implement.

Strategy # 5. Develop Regional Priorities to Guide Implementation in the Region

Over the past ten years, the six regional committees has been providing input to various agencies and organizations responsible for making major policy and funding decisions. Input has been gathered at the regional committee meetings through a series of committee discussions and worksheets. The Coordination Committee should continue to help set priorities that promote the implementation of this Plan and support increased coordination amongst partners in the region.

Strategy # 6. Promote Cross Boundary Projects

Since 2000, the Northeast Landscape Coordination Committee has supported numerous Manitou Collaborative or cross boundary demonstration projects. Some of these collaboratives include the Manitou, Sand Lake Seven Beavers, Echo Trail, North Shore Forest projects. The Coordination Committee should continue to support the implementation of these projects and strongly encourage the implementation of the goals and objectives in this Plan through these projects. The Coordination Committee should also seek out new collaborative projects within the region that promote collaborative or cross boundary efforts that support the implementation of this Plan.

Strategy # 7: Expand and Sustain Outreach

One of the key steps in encouraging partners to integrate the goals and objectives in this Plan into their strategic resource management plans and projects is to increase their awareness of the Plan itself. The Coordination Committee should develop and implement an outreach strategy that increases awareness of the Plan. The strategy could include the workshops, presentations, direct mailings and the placing of documents on the MFRC website.

Section 9

Monitoring and Evaluation Framework



The section serves as an initial outline for monitoring and evaluating the implementation of this Plan over the next ten to twenty years. The Northeast Landscape Coordination Committee will be responsible for developing and implementing a monitoring and evaluation program. This Committee will periodically review progress made towards the implementation of this plan based on information provided by partners in the region and report their findings to the Minnesota Forest Resources Council.

A. Background

Monitoring is a fundamental component of landscape-level planning and is identified in Minnesota Statute 89A.07 of the Sustainable Forest Resources Act as:

“The DNR Commissioner shall maintain a program for monitoring broad trends and conditions in the state’s forest resources at statewide, landscape, and site levels. To the extent possible, the information generated under the monitoring program must be reported in formats consistent with the landscape regions used to accomplish the planning and coordination activities specified in section 89A.06.”

The SFRA furthers states, *“To the extent possible, the program must incorporate data generated by existing resource monitoring programs.”* The SFRA also calls for compliance and effectiveness monitoring of forest management activities.

The Planning Committee used this legislative direction to recommend a monitoring program that relies on existing resource monitoring programs.

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B. Monitoring Results from the First Generation Northeast Landscape Plan

The first generation Northeast Landscape Plan recommended the development of a high quality monitoring system by the Coordination Committee that would analyze the rate of change relative to the landscape goals and measure progress towards the long-term desired future conditions at five-year intervals. The Range of Natural Variation (RNV) estimates were to be used as the benchmark and the current condition as a baseline for each five-year assessment.

The following measures were to be used for the monitoring process:

- Acres of each major forest plant community by species.
- Acres of each major forest plant community by growth stage.

- Acreage goals for each major forest plant community specified in public agency land management plans and in other plans if available.
- Harvest goals for each major forest plant community specified in public agency plans and in other plans if available.
- Acres affected by specific silvicultural practices.
- Number of land managers trained at silvicultural workshops.
- Number of conifer seedlings produced by species at Minnesota tree nurseries.

The primary monitoring efforts of the first generation plan consisted of 1) an assessment of composition and structure of northeastern forests as they relate to the Range of Natural Variation (RNV) and 2) assembling information about the activities of land managers who agreed to participate in plan implementation.

Range of Natural Variation Assessment

The First Generation Northeast Landscape Plan specified goals for several plant communities based on a comparison between the current abundance and a historic abundance of the plant community that would conform to the range of natural variability (RNV). In addition, the plan called for spatial patterns (e.g., size and location of openings) that maintain natural communities and viable populations of plant and animal species. However, the RNV analyses focused only on the goals for plant communities.

Plant Community	2003 Northeast Landscape Plan Plant Community Goals
Mesic White-Red Pine	<ul style="list-style-type: none"> – Increase the white and red pine component – Increase the 101+ growth stage of red and white pine
Mesic Aspen-Birch	<ul style="list-style-type: none"> – Increase the 81+ multi-aged conifer growth stage – Increase the white pine, white spruce, and tamarack component
Dry-Mesic White-Red Pine	<ul style="list-style-type: none"> – Increase the red and white pine and white spruce components – Increase the older growth stages (121+ years)
Jack Pine-Black Spruce	<ul style="list-style-type: none"> – Increase jack pine component throughout the entire plant community
Northern Hardwoods	<ul style="list-style-type: none"> – Increase the white pine, yellow birch, white spruce and white cedar components – Move every growth stage toward RNV over the next 150 years

In 2006, George Host and Terry Brown (Host and Brown 2006) compared the 2003 FIA inventory and the initial 1990 FIA analyses conducted by White and Brown (2002) to document the degree to which northeastern forest types had changed relative to RNV during the intervening years. Their analysis included plant communities from the Northern Minnesota & Ontario Peatlands and the Northern Minnesota Drift and Lake Plains ECS Sections which were not included in the First Generation Plan.

This analysis does not provide information on Plan implementation as the First Generation Plan was not approved until 2003. However, it serves as an excellent baseline for future analysis. Findings from the 1990 to 2003 FIA Analysis:

- Many of the plant community growth stages showed little change between the two assessments – this was expected for such a short interval.
- Many of the pole-mature size classes that were more abundant than is consistent with RNV in the 1990 FIA analysis were even more abundant in the 2003 FIA analysis.
- They also noted that old and multi-aged forests and some of the plant communities were rare or absent in the 2003 inventory.

Land Management Activities and Forest Characteristics

A subgroup of the Northeast Landscape Coordination Committee called the “All Lands Team” which consists of representatives from Lake County, St. Louis County, the Superior National Forest, the Department of Natural Resources, and The Nature Conservancy summarized data on the native plant communities they manage and their forest management activities in an accomplishment report for the period 2000-2012 (Miller 2012, www.mn.gov/frc/initiatives_llm_committees_northeast.html).

They observed:

- Based on FIA data, the landscape has moved toward the plan goals of more red, white, and jack pine and white spruce forests as well as the goal to increase the 100+ age group.
- No consistent quantifiable data were submitted from the land management agencies to determine if the landscape as a whole was moving toward plan goals.
- Collaborative efforts to work on joint timber sales, grants, and other management activities have furthered plan goals on specific areas in the Northeast Landscape.
- Land management agencies are developing coordinated landscape timber harvest plans designed to accomplish landscape goals in the future.
- The first decade of implementing landscape goals is too short a timeframe to detect significant change; however, the establishment of Collaboratives, the development of positive relationships between land managers, and the commitment of land management agencies to achieve landscape goals should increase the ability to achieve landscape goals in the next decade.
- A consistent method to quantifiably monitor plan implementation by plant communities in the Northeast Landscape should be a high priority during the Northeast Landscape Plan Revision effort.

They also summarized the activities and accomplishments of several subgroups focused on opportunity areas:

- Manitou Collaborative: Completed several collaborative timber sales; developed trial monitoring system; prepared management plan for Collaborative and completed a variety of other projects
- Sand Lake/Seven Beavers Collaborative: Collaborative Big Lake Timber sale, currently completing conifer restoration on the timber sale; prepared management plan for Collaborative; and completed a variety of other projects
- Echo Trail/Vermillion River Collaborative: Have been concentrating on acquiring permanent road access on future areas for timber sales and management activities; are in the process with an exchange of ROW with the USFS, Potlatch, and Forest Capital Partners; have committed to identifying areas where collaboration on timber sales would be beneficial.
- North Shore Forest Collaborative: New Collaborative established with the main emphasis to restore and maintain native trees and associated forest communities along the North Shore of Lake Superior; have hired a coordinator to manage the Collaborative and are working with private landowners and land management agencies along the North Shore.
- Moose Management Grant: “All Lands Team” was successful in obtaining a \$900,000 grant to improve moose habitat through the re-establishment of conifer species and other moose management practices.

C. Outline for the Northeast Landscape Plan Monitoring/Evaluation Program

The Planning Committee recommends the following questions be addressed to evaluate the implementation and effectiveness of this Plan:

1. Implementation Monitoring: Are management actions being carried out in a manner that is consistent with the plan?
2. Resource Trend Monitoring: Are management actions moving the Northeast Landscape towards the goals outlined in the plan?

It is important to emphasize that implementation of this and all MFRC Landscape Plans is voluntary and that the proposed monitoring program should be viewed as a means to improve and enhance coordination in the management of forest resources on landscape to sub-landscape levels. This process is not intended to subject partners to any type of enforcement or regulatory action.

Implementation Monitoring: Are management actions being carried out in a manner that is consistent with the plan?

The Planning Committee developed a series of monitoring questions to help refine the goal and objective statements in Section 6 and make measuring their implementation and effectiveness more successful. This listing of the plan objectives, monitoring questions, and potential data sources was also organized into a separate table for use and consideration by the Northeast Landscape Coordination Committee in developing the overall monitoring framework. This table is available in Appendix E.

This Plan lays out an ambitious framework for promoting sustainable forestry across the region over the next ten to twenty years. The Planning Committee recommends the Northeast Landscape Coordination Committee prioritize the objectives in Section 6 to help screen down the most important areas to focus efforts. To support the screening process the “SAM” principle should be applied to review and refine the objectives and the relevant monitoring efforts. When setting priorities, the Northeast Landscape Coordination Committee should consider the following questions for each objective in the Implementation Monitoring table:

1. Is the objective: (S) significant?
2. Is the objective: (A) attainable?
3. Is the objective: (M) measurable?

Resource Trend Monitoring: Are management actions moving the Northeast Landscape towards the goals outlined in the plan?

This section focuses on measuring resource trends in the region with a particular focus on forestland cover, forest composition, and age class distribution. The Planning Committee recommends this monitoring is primarily accomplished using Forest Inventory and Analysis (FIA) data with the inclusion of additional data as appropriate.

While developing the Implementation Monitoring Framework, the Coordination Committee should consider whether there are other resource trends they would like to focus on and adjust their approach as necessary.

Forestland Cover

One of the primary policy directives in the Sustainable Forest Resources Act (SFRA) is to “foster no net loss of forestland”. The Northeast Planning Committee recommends that forestland estimates from FIA and the National Land Cover Database (NLCD) be collected and reported consistent with FIA cycles.

Forest Composition and Age Class

This plan is first and foremost a forest plan. Therefore, a key component to evaluate its effectiveness will be to look at trends in forests at various scales across the landscape. The Planning Committee recommends using FIA data across the entire landscape and within the specific Native Plant Communities identified in Section 7. The species composition and growth stage tables in Section 7 provide the foundation for establishing a monitoring approach for forest composition based on the native plant communities in the region (example below). The Planning Committee recommends that FIA data be gathered and organized at regular intervals and that this data is used as a means to monitor and evaluate the overall direction that forests in region are moving.

The Planning Committee proposes this data initially be collected using the NRRI ‘NPC Geospatial Model’ using the system-level as a filter for FIA data. This will not be directly comparable to the methods John Almendinger et al. used to collect the FIA 1990 estimates, and will be at a different NPC level, but can provide the Coordination Committee a rough estimate of changes in these NPC systems over time. Further, the Planning Committee recommends seeking funding to update the NPC classification system that John Almendinger et al. used to collect the 1990 estimates to the new FIA plot numbering system. This will allow for more direct comparisons between the 1990 FIA data and the continuous FIA monitoring system initiated in 1999.

Every five years the Northeast Coordination Committee should review these results and compare it with the vegetation management goals and strategies to determine if the collective management actions are having the desired on-the-ground effect. The Coordination Committee should share and discuss these trends with partners in the region and identify ways that land managers can more effectively manage forest resources to better attain the goals in the Plan.

FDn32: Northern Poor Dry-Mesic Mixed Woodland																		
Tree Species	Young (0-35)						Transition (35-55)						Mature (55-95)					
	PLS	FIA '90	FIA '03	FIA '08	FIA '13	FIA '18	PLS	FIA '90	FIA '03	FIA '08	FIA '13	FIA '18	PLS	FIA '90	FIA '03	FIA '08	FIA '13	FIA '18
Jack Pine	40%	1%					↓↓	↓					10%	0%				
Black Spr.	1%	1%					↑↑	↑					31%	10%				
Red Pine	3%	--					↑						5%	--				
Quaking Aspen	24%	74%					↓↓	↑↑					7%	43%				
White Pine	5%	--					↑	↑					10%	2%				
Paper Birch	19%	8%					↓	↑					17%	16%				
Balsam Fir	6%	15%					↑	↑					13%	27%				
Misc.	2%	1%											7%	2%				

For Table Interpretation: See p. 7-2

Technical Support Documents

The Planning Committee recommends this Plan be updated approximately every ten years or as major conditions in the region merit amendments. To support this and previous planning processes, the MFRC has prepared several technical support documents. These documents are based on the overall guidance for landscape planning set forth by the MFRC. These documents help inform planning committee members, stakeholders in the region and the MFRC itself and can support the overall monitoring effort. These documents support the observation and documenting of numerous major trends relevant to sustainable forestry including:

- Amount of forestland, timberland, and other land uses
- Ownership of forestland
- Native Plant Community and cover type composition of forestlands
- Forestland age class structures
- Timber volume and quality
- Forest growth, mortality, and harvest
- Frequency, intensity, and geographic extent of wind throw, wildfire, drought, and flooding

The following reports should be maintained and updated every ten years to support landscape planning efforts in the region:

- Resource Atlas
- Demographic Data Report
- Conditions & Trends Report
- Forest Policy Inventory
- Forest Economics Analysis

Cooperation and Funding

Obtaining data from partners working in the region that is both useful and scalable at landscape to sub-landscape levels is essential to effective monitoring of the Northeast Landscape Plan. Land managers in the region need to share data regarding their activities in ways that can be used to evaluate progress towards the Plan's goals and objectives for a landscape-level monitoring program to be successful.

Furthermore, there needs to be adequate budgets and staff resources in the MN DNR and MFRC as well as with the major land owners in the region to prepare the monitoring and evaluation documentation. The Planning Committee noted that inadequate resources and commitments for the first generation monitoring program resulted in fewer opportunities to more fully implement the plan.

While the Planning Committee recognizes public resources for monitoring are limited, it recommends that the MFRC work closely with the MN DNR and other major landowners in the region to inform the legislature that increased funding resources are needed to support the development and maintenance of the monitoring system.

In conclusion, it is essential that partners and the public be aware that the landscape management process, including monitoring and evaluation, is voluntary, and that the primary purpose of landscape level monitoring is to support and enhance better forest resources planning and coordination.

Section 10

Recommendations to Agencies and Organizations



The purpose of this section is to summarize specific recommendations from the Planning Committee to specific agencies and organizations working in the region or the state on sustainable forest management. The intent is to assist people from these entities in finding specific strategies that apply to their organizations or personnel interests.

One overarching recommendation from the Planning Committee was to encourage all organizations and agencies, all landowners and citizens, to use this Plan and the corresponding maps and data in as many ways as possible. As a regional level plan, it is intended to provide a broad context on how forest resources can be managed sustainably.

The following represents an initial list of recommendations:

A. Recommendations to Resource Agencies

1. Use this Plan as a reference document when developing plans and strategies.
2. Work with partners to ensure ecological, economic, and social goals are being achieved across the landscape and that your organization is contributing to the achievement of these goals and objectives.
3. Find ways to more effectively support and foster economic development opportunities for the primary and secondary forest products industries in the region. Work with partners to ensure a sustainable and predictable supply of timber to the regional mills.
4. Recommend that the USDA Forest Service support and maintain the consistent gathering of forest resource data through its Forest Inventory and Analysis (FIA) program to ensure that relevant landscape level data can be obtained to support the monitoring and evaluation of this Plan.
5. Continue to promote ecological classification systems and the development of crosswalks to the Native Plant Community system to allow for better communication between the various classification systems used by resource agencies. Encourage the inclusion of NPC classifications into stand exam procedures and use this information to inform cover type site selections.
6. Support the collection, organization, and evaluation of forest resources related data and encourage the coordination and sharing of data with other resource agencies and local officials.
7. Continue to improve the awareness and delivery of technical, educational, and financial assistance on forest management to private landowners. Find ways to increase funding for the private forest management program.
8. Recognize the cycles and time horizons of natural outbreaks or disturbances and look for opportunities to reduce forest mortality and capture economic value prior to mortality across the landscape including collaboration on cross boundary projects.

Insert Photo in Final Document

B. Recommendations to Conservation and Non-governmental Organizations

1. Use this Plan as a reference document when developing plans and strategies.
2. Continue to partner with land management entities to support sound planning, management, and education efforts which address major ecological, economic, and social resource management issues in the region.
3. Work with landowners to increase awareness of forest resources issues and provide a link to opportunities available to address these issues.
4. Support the connection of citizens and elected officials with sustainable forest management topics.

C. Recommendations to Education Groups

1. Combine sustainable forest management with other educational areas such as water resources, land use, and economic development.
2. Encourage the connection of elected officials with their constituent groups through education programs. Promote and support sustainable forest education programs that connect informed citizens with elected officials.
3. Colleges and universities throughout the state are encouraged to connect their students and faculty with the goals of landscape-level planning and find ways to support its implementation.

D. Recommendations to Local Officials

1. Local officials are strongly encouraged to refer to this Plan as a reference document when developing their local plans.
2. Local officials are strongly encouraged to incorporate a more comprehensive consideration of natural resources into their land use planning processes.
3. Local officials are encouraged to consider the values and benefits that forests can bring to their communities. Healthy and sustainable forests promote a high quality of life for citizens and can support increased economic opportunities as well.
4. Maintaining healthy forests in a watershed is one of the best methods for protecting high quality water resources and local officials are encouraged to integrate the information developed in this Plan into their local water plans.

E. Opportunities for Private Landowners and Citizens

1. The MFRC and its partner agencies and organizations have numerous programs and resources to help landowners become more informed about sustainable forest management and the benefits of forests to our communities. All landowners are encouraged to become more knowledgeable about forest resources. Learning about best management practices (BMPs) is one easy way to get started. Recognize that forestry is a long-term endeavor and that changes on the land will generally take several years to become realized.
2. While there are numerous sources of information available, landowners are encouraged to seek technical assistance to help manage their forestlands. Often a landowner may need assistance from many technical service providers. Developers can benefit from working with the forest resources on their lands and designing their developments.
3. Citizens and landowners are encouraged to get involved in their communities and help promote sustainable forest management.

F. Recommendations to the Forest Products Industry

1. Participate in the Landscape Plan revision and coordination processes.

G. Recommendations to the Minnesota Forest Resources Council

1. Support integration of landscape planning by developing tools or documents that will help local officials, resource agencies, foresters, land managers, and landowners learn how to use MFRC Landscape Plans in their long range planning and implementation activities.
2. Support the increased sharing of ideas and experiences between the landscape committees as well as new and successful sustainable forest management activities taking place within the regions. Support communication tools to increase awareness about successful sustainable forest management activities throughout the state and in other states.
3. Find ways to increase funding support for the private forest management program administered by the DNR to effectively serve more landowners.
4. Coordinate timing of Landscape Plan revisions with the revision of agency operational plans.